act as an appropriate lubricant for drawing stainless steel wire through dyes. The process was very similar to the current processes except lead was used instead of the pre-coat solution or the nickel and copper coating process. The lead-coated wires were subsequently treated with lime to provide the roughness needed to draw the soap into the dye. Beginning in 1960, all wire was handled in this method. Techalloy changed over to the current processes in the 1970s.

From 1980 to 1988 the spent acids (pickle liquor) and rinse water from the pickling process were treated in-house at the acid treatment unit. The acid treatment unit was a batch neutralization and filtration system with the process code T01. Treatment was initiated after waste acid was diverted to the system and one of the two 1,000-gallon waste acid collection tanks became full. Neutralization was first achieved with the metered addition of caustic (sodium hydroxide or potassium hydroxide) until a near-neutral pH was reached. The neutralized acid was then conveyed to bag filters, and the filtrate was clarified and recycled to the acid rinse tanks on the production line.

History of Waste Generation and Disposal

This subsection provides a summary of the wastes generated and their associated disposal practices.

Spent acids (D002, D007) are generated from the pickling baths that remove scale from the wire. From 1960 to 1980, the spent acids were evaporated in the spent acid holding pond. From 1980 to 1988, the spent acids were treated at the in-house treatment facility. From 1988 to the present, the spent acids have been removed directly from the pickling tanks and transported to Clean Harbors of Chicago, Inc., Chicago, Illinois for treatment. The acids (nitric, sulfuric, hydrofluoric and muriatic) are generated at a rate of approximately 3,000 gallons one to three times per month.

The pickling rinse water (D002, D007) accumulates from rinsing the wire between acid baths. From 1960 to 1980, the rinse water was also evaporated in the spent acid holding pond. From 1980 to 1988, the water was treated at the in-house treatment facility. From 1988 to the present, the rinse water has been removed and transported to Clean Harbors of Chicago, Inc., for treatment. Approximately 5,000 gallons accumulates one to three times per month.

Plating wastewater was generated from the copper cyanide and nickel sulfate plating process. From 1968 to 1979, the plating wastewater was occasionally discharged at the northeast corner of the facility (PRC Consultants, *Preliminary Assessment: Techalloy Illinois, Inc.*, 8 November 1991). From 1980 to 1988, the wastewater was treated at the in-house treatment facility. In 1988, the plating process was converted to a closed loop filter system. Expended plating filters accumulate from the replacement of the filters in the plating tanks. The filters are transported to Cyanokem, Inc. of Detroit, Michigan for treatment. The filters accumulate at a rate of 110 gallons per year.

Ammonium bifluoride (ADS) sludge accumulates in the rinsate tanks. The sludge has always been transported off site. Presently, the sludge is collected in drums and transported to Clean Harbors of Chicago, Inc. for treatment. The sludge accumulates at a rate of approximately 600 gallons every two months.

Nonhazardous sludge from a proprietary borate salt solution (SP-6) is accumulated from the cleaning of the lubricant tanks. The sludge has always been transported off site. Presently, the sludge is shipped to Clean Harbors of Chicago, Inc., for treatment. The sludge accumulates at a rate of 165 gallons every two to three years.

Trichloroethane (1,1,1-TCA and 1,1,2-TCA) was used as wire degreaser from 1968 to 1978. During this time period, spent TCA was treated by evaporation on a concrete pad at the northeast corner of the facility. Since 1978, TCA has not been used at the facility.

A variety of waste oils is also generated on site. The oils have always been transported off site for disposal.

High viscosity waste oil is generated in the wire drawing process. The oil is transported to Clean Harbors of Braintree, Inc., Braintree, Massachusetts for incineration. The oil accumulates at a rate of 2,585 gallons per year.

Water soluble waste oil is accumulated from cooling the dyes in the machines. The oil is transported to Clean Harbors of Chicago, Inc. for treatment. The oil accumulates at a rate of approximately 275 gallons per year.

Crankcase oil from general vehicle and machinery maintenance is transported to American Chemical Services in Griffith, Indiana for treatment. The oil accumulates at a rate of 1,430 gallons per year.

Regulatory History

On 15 August 1980, Techalloy filed a Notification of Hazardous Waste Activity for the Hazardous Waste Treatment Facility and the Copper Cyanide Waste Destruction Unit designating the facility as a generator and treatment/storage/disposal (TSD) facility. Techalloy filed its Part A permit application on 11 November 1980, indicating that 800,000 pounds of K063 waste was generated per year (process code T01). Since that time, the following regulatory-associated activities have taken place:

- <u>21 April 1982.</u> IEPA determined Techalloy was lacking a written waste analysis plan, and a written description of necessary training for facility personnel (PRC Consultants, *Preliminary Assessment: Techalloy Illinois, Inc.*, 8 November 1991).

- <u>15 July 1985.</u> IEPA determined Techalloy was lacking a complete waste analysis plan, a contingency plan and operating record, operator inspections, and training records. The Part A permit did not include all waste activity at the facility, and waste containers were not labeled. (Ibid.) According to U.S. EPA's contractor (PRC), all above waste issues were corrected by 14 February 1986. (*Ibid.*)

- <u>2 December 1985.</u> Permit and notification were revised to add F001 and D003 wastes (T01) and change the K063 waste to K062 waste (process codes S02, T01).

- <u>18 January 1988.</u> IEPA determined Techalloy was lacking a complete waste analysis plan and their Part A permit contained an improper process code. According to U.S. EPA's contractor, the code issues were corrected by 27 May 1988. (*Ibid.*)

- <u>18 January 1988.</u> Notification and permit were resubmitted to add F006 and D002 wastes (T01) and change the process code on the D003 waste to T04.

- <u>22 March 1990.</u> IEPA determined Techalloy lacked written assessments of system integrity for the wastewater treatment and pickling rinse tanks, failed to accurately identify waste, and failed to properly label waste containers. (Ibid.) <u>30 May 1990.</u> According to U.S. EPA's contractor, above issues were corrected. (*Ibid.*)

- <u>December 1990.</u> Added F008 waste and indicated production of 3,187,000 pounds of D002 waste per year (S02).

- <u>In 1991,</u> WESTON, on behalf of Techalloy, submitted a RCRA closure plan to IEPA for the Copper Cyanide Waste Destruction Unit (cyanide tank), the Hazardous Wastewater Treatment Facility (acid treatment unit), and the Acid Tank Room (acid pits or pickling house). Figure 2-4 illustrates these Solid Waste Management Units (SWMUs). IEPA approved the closure plan on 8 February 1991. At the present time, all three of these units are undergoing RCRA closure. The Copper Cyanide Waste Destruction Unit and the Hazardous Wastewater Treatment Facility are inactive and have been

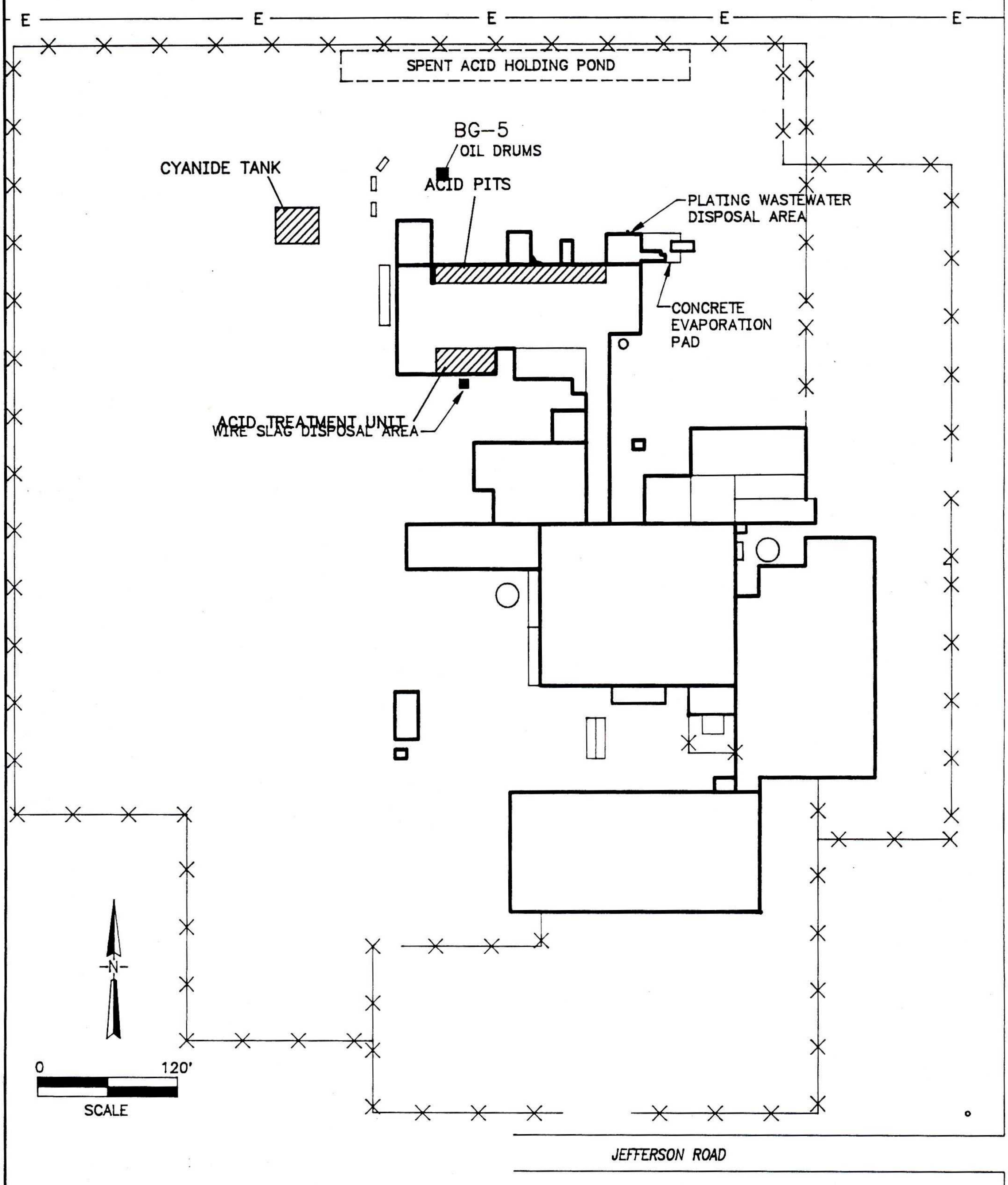

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FIGURE 2-4

WESTON MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PREVIOUS RCRA FACILITY
CLOSURE PLAN SWMUs
TECHALLOY COMPANY, INC.
Union, Illinois

dismantled. The Acid Tank Room was closed and retrofitted. The retrofitted facility is currently active.

Techalloy has applied for a permit from IEPA for air pollution control equipment to govern emissions at 15 acid descaling tanks and seven annealing furnaces.

2.2 PAST DATA COLLECTION ACTIVITIES AND CURRENT STATUS

The Techalloy Company, Inc., remains an active specialty handler of stainless steel wire products in Union, Illinois. The facility's manufacturing processes are described in Subsection 2.1.

Phase I Soil Investigation

The first investigation (Phase I investigation) took place in January 1990. U.S. Testing, Inc. conducted an environmental assessment and subcontracted Roy F. Weston, Inc. (WESTON®) to perform field activities. WESTON collected soil samples as part of a real estate transaction assessment.

A total of 10 soil borings (SB-05 through SB-14) were drilled in areas adjacent to the settling pond, the drum storage, the tank storage, the evaporation pad, and the wastewater discharge area. A geological model cross section has been drawn through the plume area. This cross-section model is located in the work plan in Figure 2-10b on page 2-36b. The soil sample locations are shown in Figure 2-5. Additionally, a soil sample, SS-01, was also collected from SB-12 soil boring location at a depth of 2 to 5 feet bgs.

Soil samples SB-05 through SB-14 were analyzed for parameters listed in Table 2-1. The analytical results for samples SB-05 through SB-14 are also summarized in Table 2-1. Levels of chromium were detected in the soil sample from the settling pond area (SB-05). Levels of lead were detected in the soil sample from the evaporation pad area (SB-12). Petroleum hydrocarbons were detected above detection limits in the samples from the evaporation pad area (SB-12) and southwest corner of the building (SB-13).

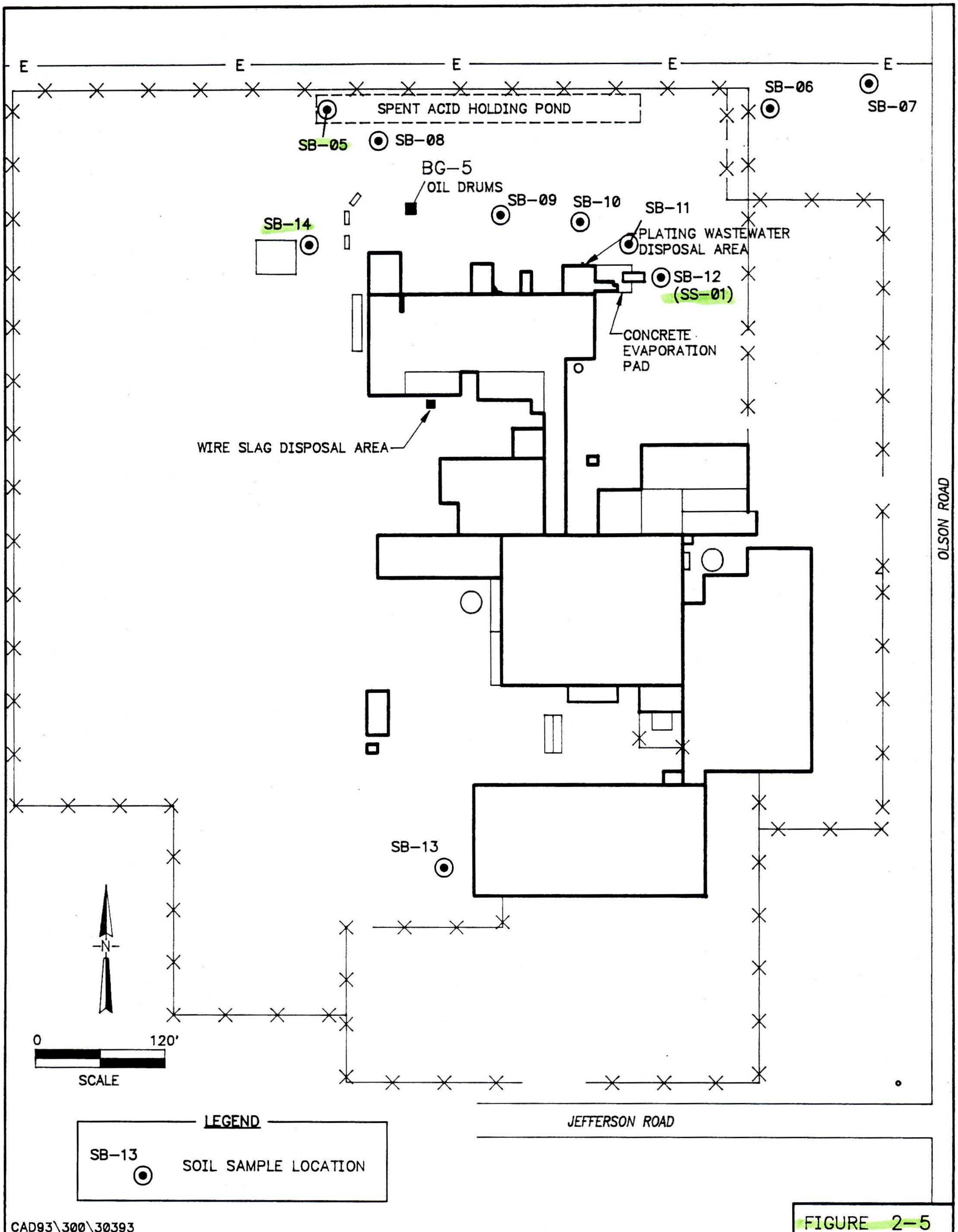

FIGURE 2-5

WESTON MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PHASE I SOIL SAMPLE LOCATIONS
TECHALLOY COMPANY, INC.
Union, Illinois

Table 2-1

Phase I Soil Investigation Results (January 1990)
Techalloy Company, Inc.
Union, Illinois
(All Concentrations in mg/kg)

Parameter	Soil Samples										
	SB-05	SB-06	SB-07	SB-08	SB-09	SB-10	SB-11	SB-12	SB-13	SB-14	Representiative Reporting Limit
Nitrate as N	ND	2.2	ND	29.6	34.6	8.2	NA	9.0	1.1	NA	1.0
pH, pH units	8.1	9.5	9.4	7.6	7.5	7.2	NA	7.4	8.6	NA	±0.20 pH units
Petroleum hydrocarbons	ND	ND	ND	ND	ND	ND	NA	39.8	193	NA	31.7
Sulfate	115	106	ND	242	188	537	NA	331	126	NA	53.1
Arsenic, total	2.7	2.5	2.2	2.0	1.8	3.3	NA	ND	1.8	NA	1.6
Barium, total	7.3	12.2	7.5	12.7	11.0	83.6	NA	72.6	6.2	NA	5.1
Cadmium, total	3.5	2.8	3.7	ND	ND	ND	NA	ND	2.2	NA	0.41
Chromium, total	2,800	13.9	5.8	15.8	11.1	34.6	NA	13.7	5.8	NA	2.1
Mercury, total	ND	ND	0.15	ND	ND	ND	NA	0.27	ND	NA	0.085
Lead, total	ND	ND	ND	9.0	5.7	64.6	NA	427	4.7	NA	5.1
Selenium, total	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	0.82
Silver, total	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	3.2
Cyanide, total	NA	NA	NA	NA	NA	NA	ND	NA	NA	ND	0.52
Copper, total	NA	NA	NA	NA	NA	NA	4.5	NA	NA	6.6	2.2

ND - Nondetect.
NA - Not analyzed.
Lab Method: Standard industrial package. ICP for Ag, Ba, Cd, Cr, Cu, Pb. Hydride for As, Se. Cold vapor for Hg.

Only one soil sample (SS-01) was analyzed for volatile organic compounds (VOCs). The VOC results are summarized in Table 2-2. Levels of chlorinated hydrocarbons were detected in this soil sample. The concentration of VOCs detected in this soil sample was 1,000 mg/kg (parts per million or ppm) of 1,1,1-trichloroethane (1,1,1-TCA).

Phase II Soil Investigation

In February 1991, WESTON began a Phase II soil investigation to further characterize the shallow subsurface soils at the Techalloy property and identify potential source areas of groundwater constituents. The samples depths, locations and rationale are presented in Table 2-3. In June 1991, WESTON submitted the *Phase II Soil and Groundwater Investigation* report to the Illinois Environmental Protection Agency (IEPA).

During Phase II, WESTON collected a total of seven soil samples (SS-1 through SS-7) from areas adjacent to the acid treatment room, the heavy wire building, and the northeast portion of the Techalloy plant. The soil sample locations are shown in Figure 2-6. These areas were believed to be previous chemical spill or release areas. The sample depths, sample locations, and sample locations rationale are summarized in Table 2-3.

The soil samples were collected and analyzed on site by Tracer Research Corporation (TRC) of Tucson, Arizona. TRC used a portable gas chromatograph to analyze headspace gas from soil samples. The soil samples were analyzed on site for 1,1,1-TCA, trichloroethane (TCE), and tetrachloroethene (PCE). The analytical results are summarized in Table 2-4.

Table 2-2

Phase I Soil Investigation VOC Results (January 1990)
Techalloy Company, Inc.
Union, Illinois
(All Concentrations in $\mu g/kg$)

Volatile Organic Compounds (VOCs)	SS-01 (SB-12)	Reporting Limit
Methylene chloride	1,100 JB	5,000
Acetone	4,700 JB	10,000
1,1-Dichloroethene	19,000	5,000
1,1-Dichloroethane	6,200	5,000
2-Butanone	7,900 B	10,000
1,1,1-Trichloroethane	1,000,000	50,000
Trichloroethene	260,000	10,000
1,1,2-Trichloroethane	4,100	5,000
Tetrachloroethene	870,000	50,000
Toluene	12,000	5,000
Ethylbenzene	1,200 J	5,000
Xylene (total)	7,200	5,000

Note: Only VOCs detected above method detection limits are presented.
J - Indicates an estimated value.
B - Indicates that the compound was also found in blank.
Lab Method: Standard industrial package.

Table 2-3

Phase II Soil Investigation - Sample Location/Rationale (February 1991)
Techalloy Company, Inc.
Union, Illinois

Sample Number	Depth (ft)	Sample Location	Sample Location Rationale
SS-1	3	Western edge of the concrete slab, south of the acid treatment room.	To determine the impact of any spill or release from the acid treatment room.
SS-2	6 (To compensate for 3 feet of fill)	Southwest of the cooling tank, located south of the fine wire building and west of the heavy wire building.	To determine the impact of any chemicals that may have been released on the southwest side of the manufacturing building.
SS-3	4	Adjacent to the concrete slab, southwest of the heavy wire building.	To determine the impact of any chemicals that may have been released on the southwest side of the manufacturing building.
SS-4	4	South side of the heavy wire building.	To determine the impact of any chemicals that may have been released on the southwest side of the manufacturing building.
SS-5	5	Adjacent to the fence line north of Gate Number 2, northeast corner of the Techalloy plant.	To determine the impact of previous plant activities.
SS-6	5	Northwest of the acid house.	To determine the impact of any releases from the acid house.
SS-7	5	Adjacent to the concrete slab, east of the acid house and boiler room.	To determine the impact of any releases from the acid house.

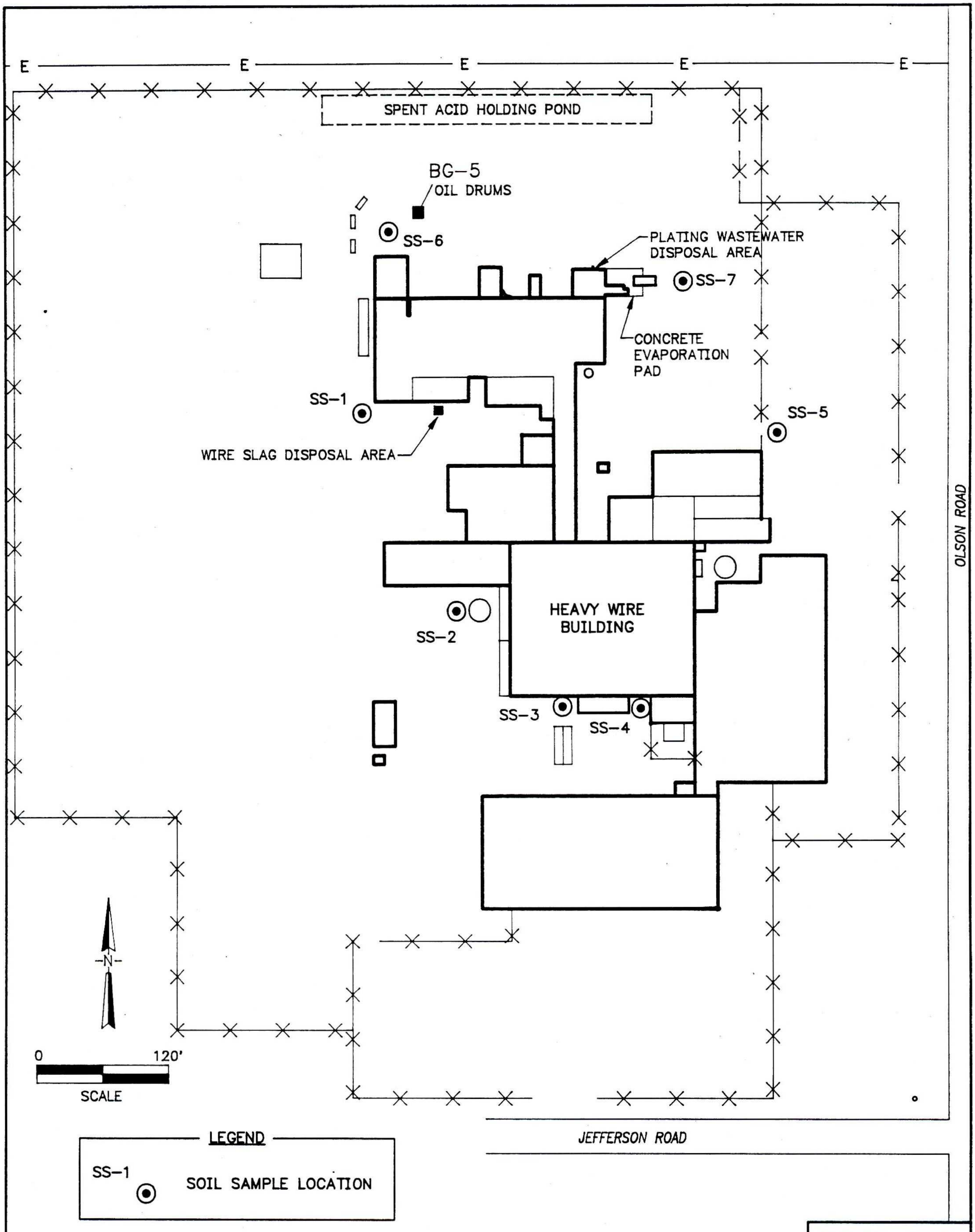

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FIGURE 2-6

WESTON MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PHASE II SOIL SAMPLE LOCATIONS

TECHALLOY COMPANY, INC.
Union, Illinois

Table 2-4

Phase II Soil Probe Analytical Results (February 1991)
Techalloy Company, Inc.
Union, Illinois
(All Concentrations in μg/kg)

Sample No.	Date	Depth (ft)	Parameters		
			1,1,1-TCA	TCE	PCE
SS-1	2/13/91	3	110	7	58
SS-2	2/13/91	6	22	7	85
SS-3	2/13/91	4	0.2	0.5	5
SS-4	2/14/91	4	2	0.2	0.9
SS-5	2/14/91	5	280	6	260
SS-6	2/14/91	5	58	1	16
SS-7	2/14/91	5	1,100	320	550
On-site (Class II) soil objective	7/90	---	1,000	25	25

Notes:

TCA - 1,1,1-Trichloroethane.
TCE - Trichloroethene.
PCE - Tetrachloroethene.
Field Method: Withdrawn with hollow steel pipes and transferred to 40 mL vials.
Lab Method: Analyzed in on-site lab.

Soil Investigations Related to Previous RCRA Closures

As previously discussed, on 8 February 1991, IEPA approved a RCRA facility closure plan for three SWMUs: the acid pits, the acid treatment unit, and the cyanide destruction unit. Those three SWMUs are distinct from the five SWMUs in the current RFI. Figure 2-4 illustrates the three SWMUs. As a part of the closure plan for the three SWMUs, WESTON conducted soil investigations in April 1991 and August 1992. The results of these investigations have been submitted to IEPA.

In April 1991, WESTON collected soil samples near the acid treatment unit, the acid pits, and the cyanide destruction unit. Five soil samples were collected below the concrete floor near the acid treatment unit. Thirty-two investigative soil samples were collected near the acid pits, 14 samples below the concrete floor within the acid house, and 18 samples outside the north wall of the acid house. Twenty-two investigative samples were collected near the cyanide destruction unit.

Soil samples collected near the acid treatment unit were determined to have significant total cyanide and PCE. Soil samples from below the concrete floor within the acid house did not have any significant concentrations of VOCs or inorganic constituents. Soil samples from outside the north wall of the acid house had significant total cyanide and lead (TCLP) concentrations. One soil sample each from the acid treatment unit and from north of the acid pits had significant sulfate concentrations. Some soil samples collected near the cyanide destruction unit had significant cyanide concentrations.

In August 1992, WESTON collected soil samples from 10 soil borings located around the perimeter of the acid pits, the acid treatment unit, and the cyanide destruction unit. The samples were analyzed to determine the extent of inorganic soil contamination resulting from operations of the three RCRA units.

Concentrations of lead and nickel were present in levels above the IEPA TCLP cleanup objectives north and west of acid pits. Chromium, cyanide, and copper were also present above the cleanup objectives north of the west end of the acid pits. Lead and nickel were present above the cleanup objectives southwest of the acid treatment unit. Analyses of Samples from the north and south ends of the cyanide destruction unit did not indicate any cyanide in the soil.

Phase I Groundwater Investigation

Groundwater is the main migration pathway of concern. The first groundwater investigation at the Techalloy facility took place in January 1990. As previously discussed, U.S. Testing, Inc. conducted a Phase I environmental assessment and subcontracted Roy F. Weston, Inc. (WESTON®) to perform the field work. This assessment is referred to as the Phase I investigation.

The Phase I investigation included groundwater sampling in former waste management areas or potential spill areas to determine if groundwater had been impacted. Three shallow monitoring wells (SP-01, SP-02, SP-04) and one deep monitoring well (WS-01) were installed during the Phase I investigation. Subsequent investigations redesignated SP-01, SP-02, SP-04, and WS-01 as MW-1, MW-2, MW-4, and MW-3, respectively. Figure 2-7 shows the locations of these wells. Groundwater samples were collected from these wells and from City Well No. 2 and City Well No. 4. These city wells lie generally crossgradient (west) of the northwest groundwater flow from the Techalloy facility. Figure 2-8 shows the location of the city wells.

Based on the known historical use of solvents at Techalloy, groundwater samples were analyzed for VOCs. Results of the VOC analyses are shown in Table 2-5. VOCs were not detected above the method detection limits in City Well No. 2, City Well No. 4, or shallow

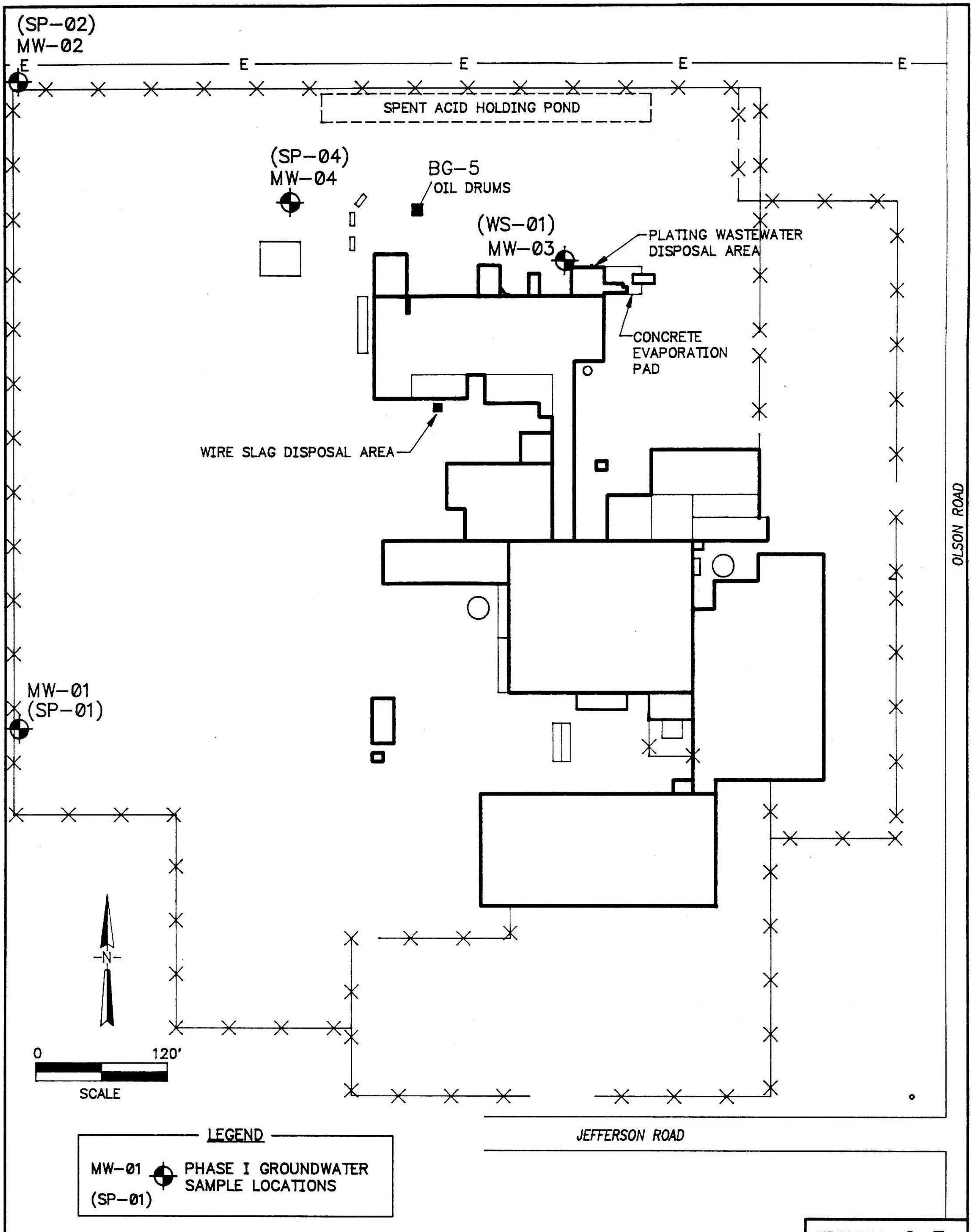

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FIGURE 2-7

WESTON MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PHASE I GROUNDWATER SAMPLE LOCATIONS
TECHALLOY COMPANY, INC.
Union, Illinois

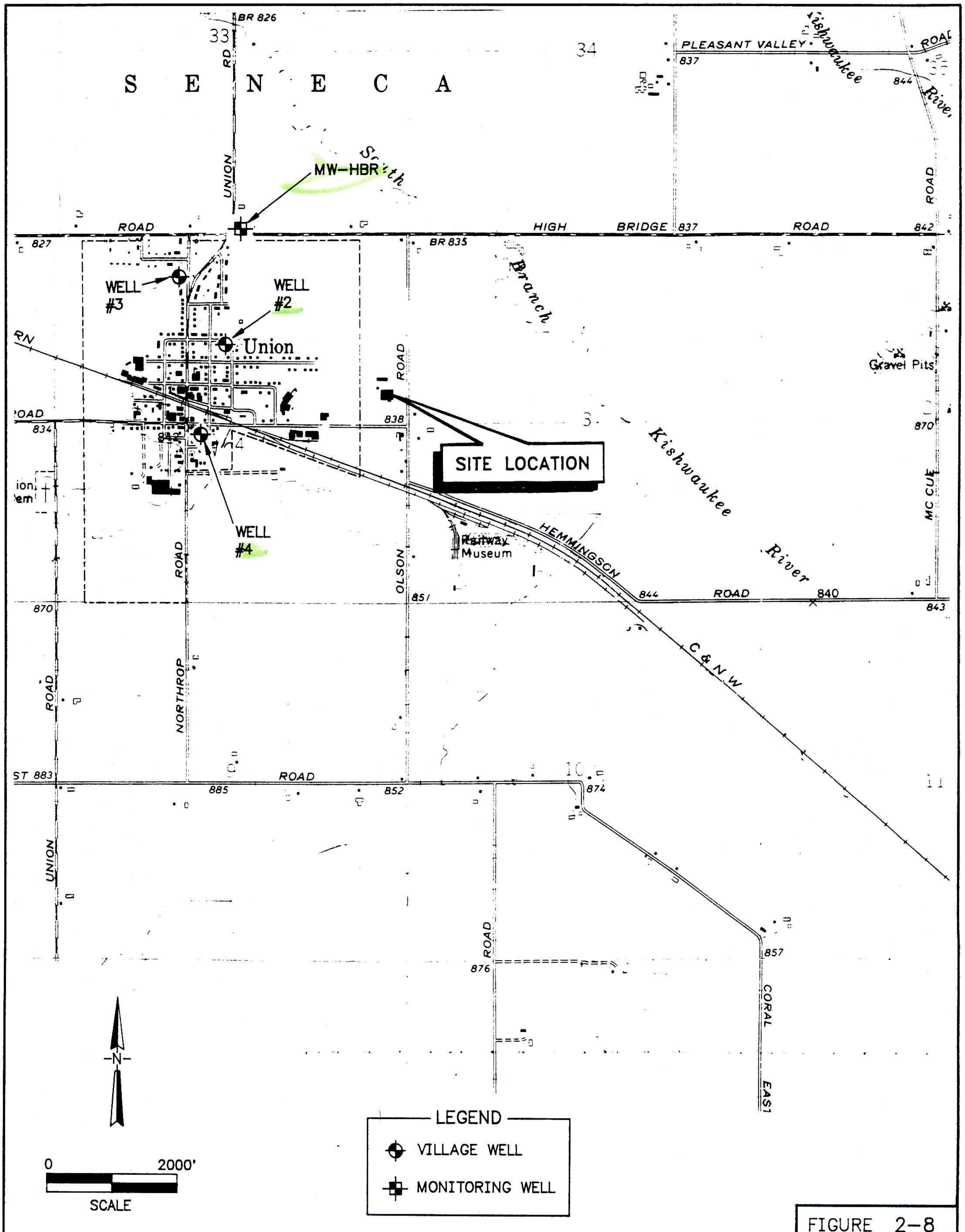

FIGURE 2-8

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PHASE I OFF-SITE
GROUNDWATER SAMPLE LOCATIONS
TECHALLOY COMPANY, INC.
Union, Illinois

Table 2-5

Phase I Groundwater Investigation Results (January 1990)
Techalloy Company, Inc.
Union, Illinois

Volatile Organic Compounds (VOCs) (µg/L)	Groundwater Sample								
	City Well No. 2	City Well No. 4	SP-01 (MW-1)	SP-02 (MW-2)	WS-01 (MW-3)	SP-04 (MW-4)	Trip Blank	Field Blank	Reporting Limit
Methylene chloride	2 J	4 J	4 J	4 J	3 J	4 J	3 J	5	5
Acetone	35 B	7 JB	7 JB	6 JB	9 JB	4 JB	6 JB	14 B	10
1,1-Dichloroethene (DCE)	BDL	BDL	BDL	99	2 J	34	BDL	BDL	5
1,1-Dichloroethane (DCA)	BDL	BDL	BDL	89	8	44	BDL	BDL	5
1,2-Dichloroethene (total)(1,2-DCE)	BDL	BDL	BDL	36	11	16	BDL	BDL	5
2-Butanone	8 J	7 J	8 J	5 J	15	4 J	3 J	4 J	10
1,1,1-Trichloroethane (TCA)	BDL	BDL	BDL	2,100	BDL	1,100	BDL	BDL	5
Trichloroethene (TCE)	BDL	BDL	BDL	94	BDL	33	BDL	BDL	5
Tetrachloroethene (PCE)	BDL	BDL	BDL	150	BDL	190	BDL	BDL	5
Chloroform	BDL	4 J	4 J	BDL	BDL	BDL	BDL	BDL	5
4-Methyl-2-pentanone	BDL	3 J	3 J	BDL	17	BDL	BDL	BDL	5

BDL - Not detected.
J - Estimated value below method detection limit.
B - Indicates the compound was found in the blank and the sample.
Lab Method: Standard industrial package. Method 8240.
Field Method: Purged and sampled with Teflon[tm] bailer. Collected in 40 mL jars. Preserved with HCl and ice.

well SP-01. However, wells SP-02, SP-04, and WS-01 were found to contain chlorinated hydrocarbons.

Phase I Follow-Up Groundwater Investigation (April 1990)

In April 1990, as a follow-up to the Phase I investigation, WESTON installed five additional shallow monitoring wells (MW-5, MW-6, MW-7, MW-8, and MW-9) and one deep monitoring well (MW-5D) along the western and northern property boundaries of the Techalloy facility. Figure 2-9 shows the locations of these wells. The purpose of the wells was to determine whether constituents were present at the property boundary and to determine the potential for off-site migration of constituents.

Groundwater samples were collected from the new wells and one Phase I well (MW-2) on 5 April 1990. Based on the known historical use of solvents and stainless steel at Techalloy, all samples were analyzed for VOCs and dissolved metals. The results are shown in Table 2-6. VOCs were present in groundwater at all the well locations sampled. The compounds 1,1,1-TCA and TCE were frequently detected. The U.S. EPA maximum contaminant levels (MCLs) were exceeded for 1,1,1-TCA (MCL-200 μg/L), TCE (MCL-5μg/L), and PCE (MCL-5 μg/L). The levels of 1,1,1-TCA and PCE exceeded MCLs in the samples from MW-2, MW-5, MW-5D, and MW-8. The level of PCE detected in the samples from MW-2, MW-5, MW-6, MW-7, and MW-8 also exceeded the MCL. No metal analyzed was detected above U.S. EPA drinking water standards. The use of dissolved metals assisted in assuring that measurements were reproducible.

Phase I Follow-Up Groundwater Investigation (August 1990)

In August 1990, an off-site, downgradient monitoring well (MW-HBR) was installed along the county right-of-way adjacent to Union Road. The purpose of this well was to determine the downgradient extent of the constituent plume and its potential to affect private water

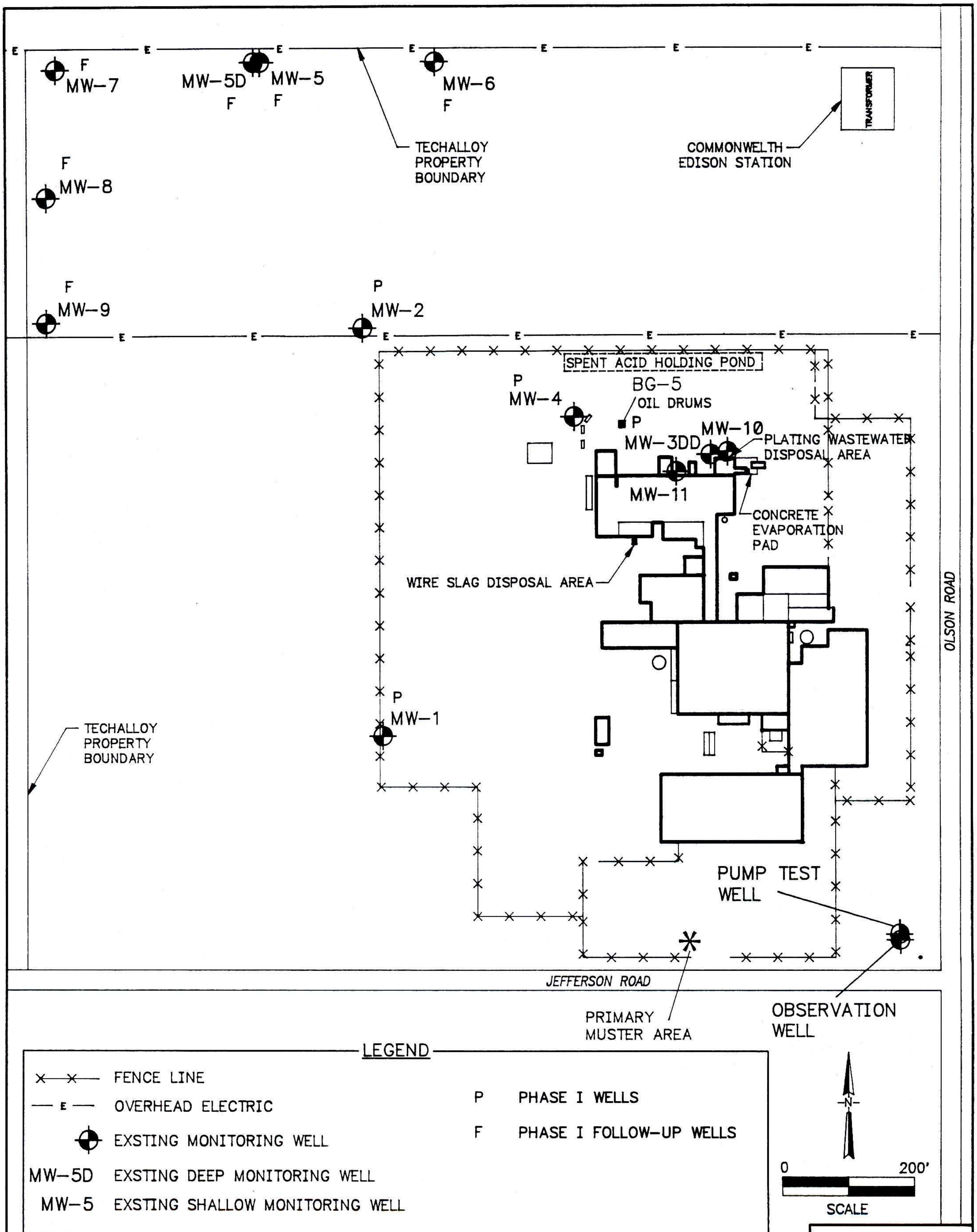

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FIGURE 2-9

WESTON MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PHASE I FOLLOW-UP WELLS
TECHALLOY COMPANY, INC.
Union, Illinois

Table 2-6

Phase I Follow-Up Groundwater Investigation Results (April 1990)
Techalloy Company, Inc.
Union, Illinois

Well No.	Groundwater Samples								
	MW-5	MW-5D	MW-6	MW-6 Duplicate	MW-7	MW-8	MW-9	MW-2	Field Blank	Reporting Limit
Volatile Organic Compounds, μg/L										
Methylene chloride	5	4 J	5	5	24	5	BDL	BDL	BDL	5
Acetone	29	13	31	BDL	44	BDL	25	26	35	10
1,1-Dichloroethene	18	5	BDL	BDL	720	54	BDL	100	BDL	5
1,1-Dichloroethane	4 J	6	BDL	BDL	290	110	BDL	86	BDL	5
1,2-Dichloroethene (total)	7	2 J	BDL	BDL	77	18	BDL	30	BDL	5
Chloroform	BDL	BDL	BDL	BDL	4 J	BDL	BDL	BDL	BDL	5
1,2-Dichloroethane	BDL	BDL	BDL	BDL	11	BDL	BDL	BDL	BDL	5
1,1,1-Trichloroethane	1,100	300	14	12	15,000	1,500	18	3,000	7	5
Trichloroethene	27	300	BDL	BDL	520	130	BDL	99	BDL	5
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	35	BDL	BDL	6	BDL	5
Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5
4-Methyl-2-pentanone	BDL	BDL	BDL	36	BDL	BDL	BDL	16	BDL	5
Tetrachloroethene	450	BDL	52	48	570	530	3 J	340	BDL	5
Metals, mg/L										
Arsenic, soluble	BDL	BDL	0.0094	0.0046	BDL	BDL	BDL	BDL	BDL	0.0040
Lead, soluble	BDL	BDL	0.018	0.0070	BDL	BDL	BDL	BDL	BDL	0.020

BDL - Not detected. J - Estimated value below method detection limit. B - Indicates the compound was found in the blank and the sample.
Lab Method: Standard industrial package. Method 8240 for VOCs. Method 6010 for metals.
Field Method: Purged and sampled with Teflon[tm] bailer. Pumped from well with an in-line pump. VOAs collected in 40 mL jars and preserved with HCl and ice. Metals filtered and collected in 500 mL jars and preserved with HNO_3 and ice.

wells located downgradient of the Techalloy property. Figure 2-8 shows the location of this well. During this sampling effort, groundwater samples were collected from MW-HBR, MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, and one production well on site.

Based on the known historical use of solvents and metals at the facility, all samples were analyzed for VOCs and dissolved metals. There is no history of using semivolatile organic compounds (SVOCs) at the facility. However, for confirmation purposes, one sample (MW-7) was also analyzed for semivolatile organic compounds (SVOCs). The results of the analysis are shown in Table 2-7. No SVOCs analyzed were detected above method detection limits. The MW-HBR sample detected 1,2-dichloroethene (1,2-DCE), PCE, TCE, and 1,1,1-TCA at concentrations above the MCLs.

Phase II Groundwater Investigation

In February 1991, WESTON began a Phase II investigation to further define the groundwater plume. Groundwater probe samples WS-1 through WS-21 were collected northwest of the Techalloy facility. The groundwater probe locations are shown in Figure 2-10. These locations were selected to delineate the downgradient and lateral extent of affected groundwater on and downgradient of the Techalloy property.

Groundwater probe samples were collected and headspace gas was analyzed in the field for TCA, TCE, and PCE. According to Tracer Research Corporation, analytical subcontractors on the investigation,

> "Headspace analysis is the preferred technique when a large number of water samples are to be performed daily. The method is more time efficient for the measurement of volatile organics than direct injection because there is less chance for semi-volatile and non-volatile organics to contaminate the system as there is with

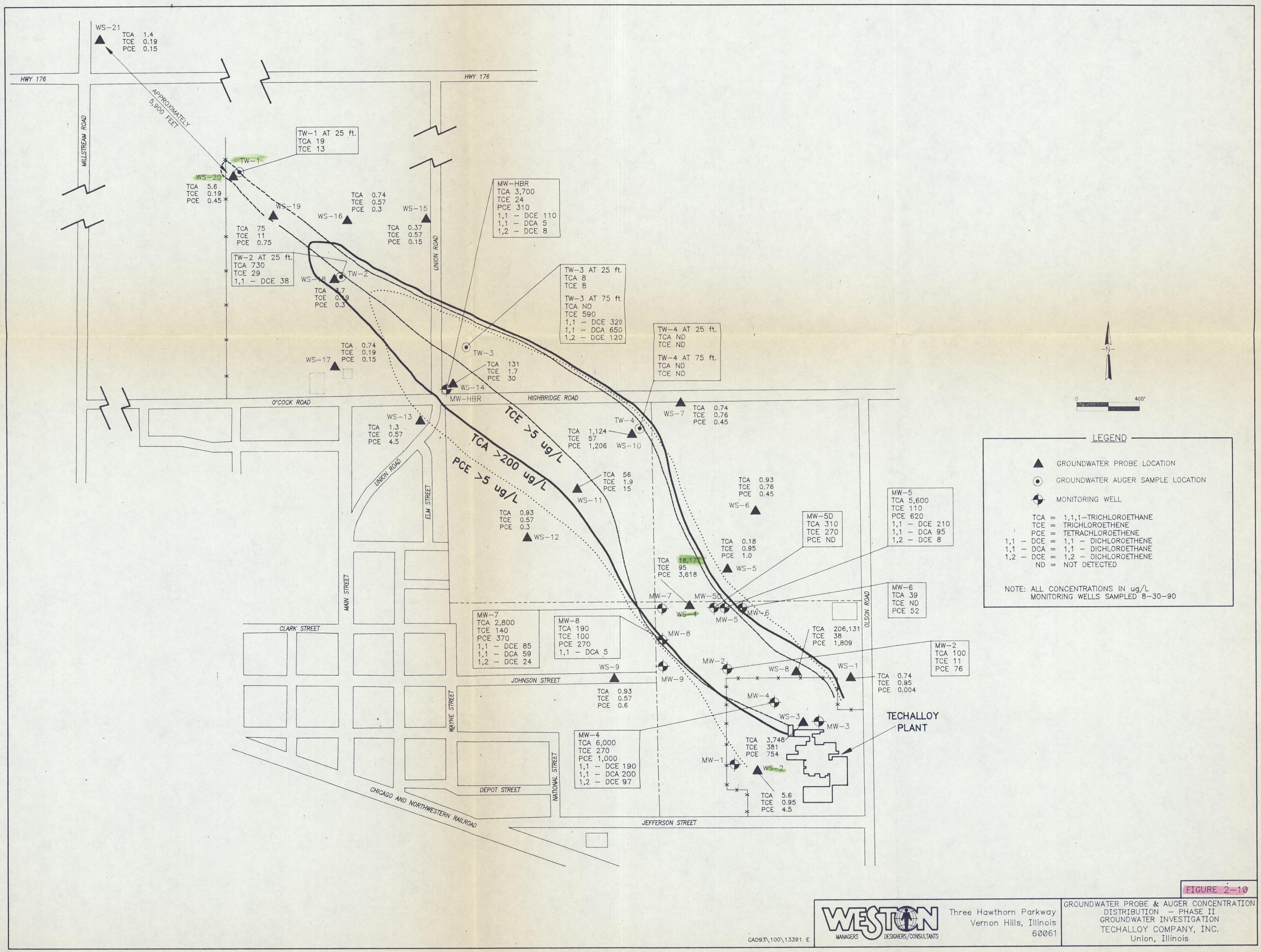


FIGURE 2-10

GROUNDWATER PROBE & AUGER CONCENTRATION DISTRIBUTION – PHASE II GROUNDWATER INVESTIGATION
TECHALLOY COMPANY, INC.
Union, Illinois

Table 2-7

Phase I Follow-Up Groundwater Investigation Results (August 1990)
Techalloy Company, Inc.
Union, Illinois

Parameter	Groundwater Samples														
	Prod. Well	Field Blank	MW-01	MW-02	MW-03	MW-04	MW-05	MW-05D	MW-06	MW-07	MW-08	MW-09	HBR	HBR-Dup	Reporting Limits
Volatile Organic Compounds (µg/L)															
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8	10	ND	5
1,1-Dichloroethene (1,1-DCE)	ND	ND	ND	ND	ND	190	210	ND	ND	85	ND	ND	120	110	5
1,1-Dichloroethane (1,1-DCA)	ND	ND	ND	ND	ND	200	95	ND	ND	59	5	ND	5	5	5
1,2-Dichloroethene (total) (1,2-DCE)	ND	ND	ND	ND	ND	97	48	ND	ND	24	ND	ND	8	8	5
1,2-Dichloroethane (1,2-DCA)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8	7	5
1,1,1-Trichloroethane (1,1,1-TCA)	ND	ND	ND	100	ND	6,000	5,600	310	39	2,800	190	ND	3,400	3,700	5
Trichloroethene (TCE)	ND	ND	ND	11	ND	270	110	270	ND	140	100	ND	24	24	5
1,1,2-Trichloroethane (1,1,2-TCA)	ND	ND	ND	ND	ND	18	9	ND	ND	ND	ND	ND	ND	ND	5
Tetrachloroethene (PCE)	ND	ND	ND	76	ND	1,000	620	ND	52	370	270	ND	320	310	5
Metals, Soluble (mg/L)															
Copper, Soluble	0.021	ND	ND	ND	ND	ND	ND	0.043	ND	ND	ND	ND	ND	ND	0.020
Lead, Soluble	0.0029	0.0027	0.0020	0.0037	ND	0.0032	ND	0.0084	0.036	0.0072	0.0028	0.0034	ND	0.0021	0.020
Mercury, Soluble	ND	ND	ND	0.0021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00020
Arsenic, Soluble	ND	ND	ND	ND	0.0043	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0040
Semivolatile Organic Compounds	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA

ND - Not detected.
NA - Not analyzed.
Lab Method: Standard industrial package. Method 8204 for VOCs. Method 8270 for SVOCs. Method 6010 for metals.
Field Method: Purged and sampled with Teflon[tm] bailer. VOAs collected in 40 mL jars and preserved with HCl and ice. Metals filtered and collected in 500 mL jars and preserved with HNO_2 and ice.

direct injection. Depending upon the partitioning coefficient of a given compound, the headspace analysis technique can also yield greater sensitivity than the direct injection technique. Both methods are similar in terms of precision and accuracy." (Tracer Research Corporation, *Shallow Groundwater and Soil Investigation: Techalloy Site*, February 1991.)

A summary of the detected compounds is presented in Table 2-8.

As a confirmatory measure, a second groundwater sampling effort was undertaken. This effort entailed collection of groundwater samples in screened hollow-stem augers and chemical analysis. Groundwater auger samples TW-1 through TW-4 were situated within the plume boundary as delineated by groundwater probe sample analyses. The auger

Table 2-8

Phase II - Groundwater Probe-Headspace Analytical Results (February 1991) Techalloy Company, Inc. Union, Illinois (Concentrations in μg/L)

Sample	Date	Depth (ft)	Parameters		
			1,1,1-TCA	TCE	PCE
WS-1	2/12/91	10	0.74	0.95	0.004
WS-2	2/12/91	13	5.6	0.95	4.5
WS-3	2/12/91	9	3,748	381	754
WS-4	2/12/91	13	18,177	95	3,618
WS-5	2/12/91	7	0.18	0.95	1
WS-6	2/13/91	7	0.93	0.76	0.45
WS-7	2/13/91	10	0.74	0.76	0.45
WS-8	2/13/91	7	206,131	38	1,809
WS-9	2/14/91	7	0.93	0.57	0.6
WS-10	2/15/91	6	1,124	57	1,206
WS-11	2/28/91	7	56	1.9	15
WS-12	2/28/91	7	0.93	0.57	0.3
WS-13	2/28/91	9	1.3	0.57	4.5
WS-14	2/28/91	10	131	1.7	30
WS-15	2/28/91	7	0.37	0.57	0.15
WS-16	2/28/91	7	0.74	0.57	0.3
WS-17	2/28/91	8	0.74	0.19	0.15
WS-18 (cf. TW-2)	2/28/91	8	3.7	0.19	0.3
WS-19	3/1/91	8	75	11	0.75
WS-20 (cf. TW-1)	3/1/91	8	5.6	0.19	0.45
WS-21	3/1/91	8	1.4	0.19	0.15
On-site (Class II) groundwater objective	1990	—	1,000	25	25
Off-site (Class I) groundwater objective	1990	—	200	5	5

Lab Method: Field GC.
Field Method: Groundwater probes were advanced into the groundwater. Groundwater was vacuumed from the probes and placed in 40 mL vials. Headspace samples were withdrawn with a syringe through the top of the vial.
Regulatory Reference: Class I standards are provided in 35 Ill. Adin. Code 620.410. Class II standards are provided in 35 Ill. Admin. Code 620.420.

sample locations are also depicted in Figure 2-10. A summary of the detected compounds is presented in Table 2-9.

Based on the Phase II combined analytical results from groundwater probe and groundwater auger samples, WESTON believes a groundwater plume originates from the northern half of the Techalloy plant area. The plume is migrating in a northwestward direction and appears to extend to, and slightly beyond, common sampling points WS-20 and TW-1, northwest of the intersection of Highbridge and Union Roads. This is a distance of approximately 4,900 feet from the Techalloy plant. Based on the plume configuration and constituent levels, the plume is believed to terminate just northwest of the sample points WS-20 and TW-1. The cross-section dimensions of the plume have also been assessed. At the facility, the plume is approximately 700 feet wide and 35 feet deep. At approximately 1,600 feet downgradient of the facility, the plume is approximately 800 feet wide and is approximately 80 feet deep. At approximately 3,200 feet downgradient from the facility, the plume starts to narrow and is approximately 400 feet wide and 85 feet deep. At approximately 4,000 feet downgradient from the facility, the plume thins to approximately 150 feet wide. The VOC that has migrated the farthest downgradient is TCE, which was detected at test well TW-1 at a concentration of 13 $\mu g/L$. Based on this data, it is interpreted that the plume diminishes within an estimated 200 feet northwest of TW-1.

__Groundwater Investigation Related to Previous RCRA Closures__

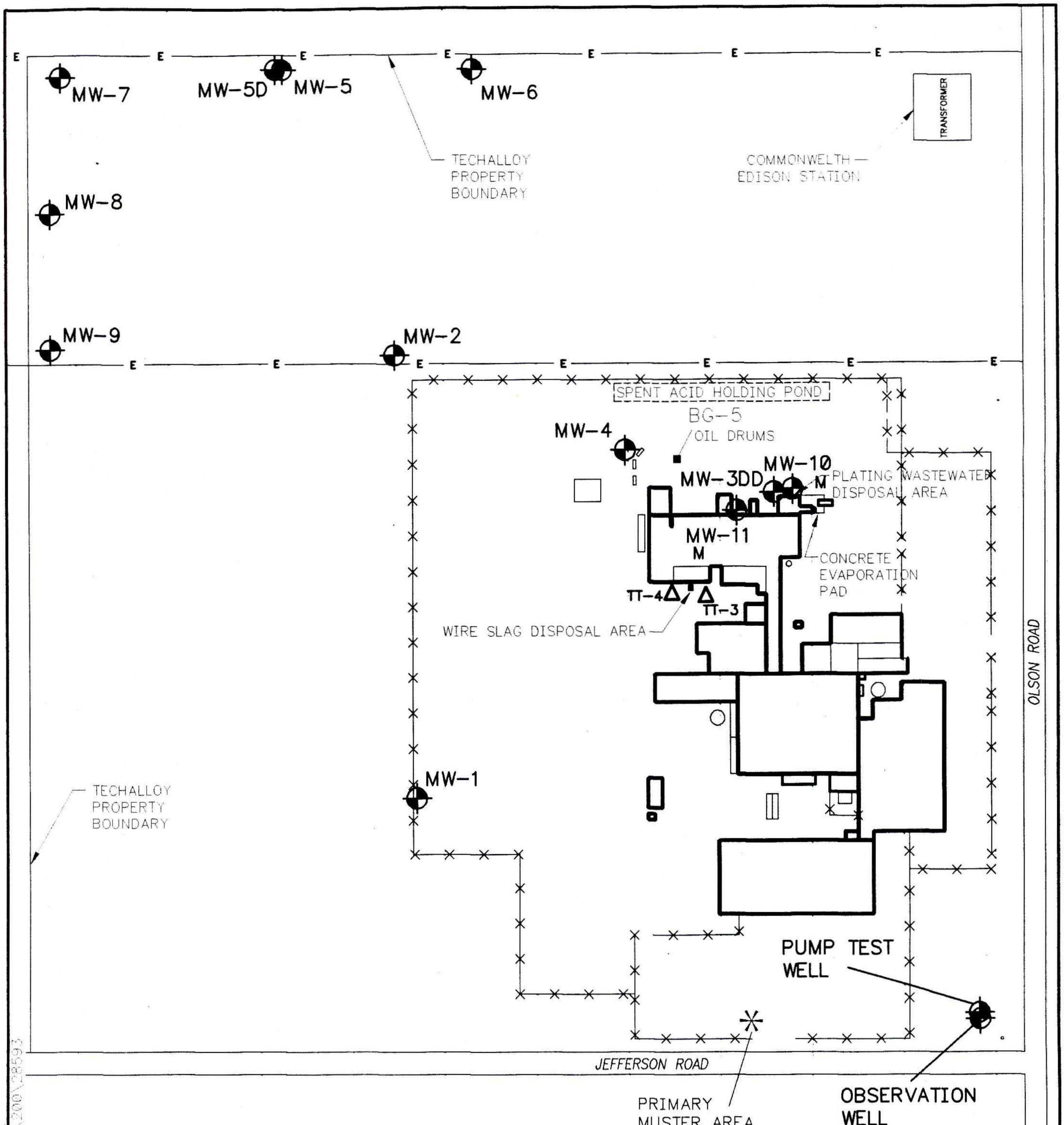
In July 1992, WESTON installed two shallow monitoring wells (MW-10 and MW-11) on the property (Figure 2-11). The wells were installed primarily to assess the occurrence of metal constituents from the acid house that may have migrated to the shallow groundwater. This investigation was performed to determine the type of RCRA closure appropriate for the units undergoing RCRA closure. MW-10 was placed near the previous plating wastewater discharge sump and directly downgradient of the TCA disposal area. MW-11 was placed

Table 2-9

Phase II - Groundwater Auger Samples Analytical Results (February 1991)
Techalloy Company, Inc.
Union, Illinois
(Concentrations in $\mu g/L$)

			Detected Compounds									
Sample	Date	Depth (ft)	1,1,1-TCA	DL	TCE	DL	1,2-DCA	DL	1,1-DCA	DL	1,2-DCA	DL
TW-1 (cf. WS-20)	4/3/91	25	19	5	13	5	ND	5	ND	5	ND	5
TW-2 (cf. WS-18)	4/4/91	25	730	25	29	5	38	5	ND	5	ND	5
TW-3	4/4/91	25	8	5	8	5	ND	5	ND	5	ND	5
TW-3 Duplicate	4/4/91	25	10	5	23	5	ND	5	7	5	ND	5
TW-3-75'	4/8/91	75	ND	5	590	25	320	25	650	25	120	25
TW-4	4/8/91	25	ND	5	ND	5	ND	5	ND	5	ND	5
TW-4-75'	4/9/91	75	ND	5	ND	5	ND	5	ND	5	ND	5
On-site (Class II) groundwater objective	1990	—	1,000		25		25		NA		25	
Off-site (Class I) groundwater objective	1990	—	200		5		5		NA		5	

Lab Method: SW-846 Method 8240.
Field Method: Three auger volumes purged with a disposable polyethylene bailer. Colelcted in 40 mL bottles. Preserved on ice.
DL - Detection limit.
ND - Not detected.
NA - Not applicable.



LEGEND

—×—×—	FENCE LINE
— E —	OVERHEAD ELECTRIC
⊕	EXSTING MONITORING WELL
MW-5D	EXSTING DEEP MONITORING WELL
MW-5	EXSTING SHALLOW MONITORING WELL
Δ	PREVIOUS SAMPLING LOCATIONS
M	MONITORING WELL LOCATION FOR PREVIOUS SWMUs

-N-

0 200'

SCALE

FIGURE 2-11

PWS-03/17/94-11:05-CAD93\200\28593

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

MONITORING LOCATIONS FOR THREE PREVIOUS SWMUs
TECHALLOY COMPANY, INC.
Union, Illinois

directly downgradient of the acid house. These wells were sampled along with the existing well MW-4 and analyzed for VOCs, cyanide, metals, and other inorganics. The analytes were chosen to reflect the chemicals historically used at the Techalloy facility. The results of the groundwater analyses are summarized in Table 2-10. These results showed that nickel and nitrate were the only inorganic constituents that exceeded their respective IEPA cleanup objectives. VOCs were also detected above their respective cleanup objectives (Table 2-10), with the most detections occurring at MW-10, located immediately downgradient of the concrete evaporation pad. These cleanup objectives were associated with the previous site work.

Source Areas

The previous investigations have carefully analyzed the soils and groundwater in general around the facility. As a result, it is possible to describe the nature and extent of the facility's environmental conditions.

As previously discussed, the present location of the Techalloy facility was farmland prior to 1960. The facility has operated as a wire manufacturer since 1960. As a result, the nature and extent of constituents are typical of a small wire manufacturing facility. Localized occurrences of acids, metals, and solvents are contained in the soils on the property. The groundwater both within the Techalloy property and downgradient beyond the facility boundary contains certain chlorinated volatile organics. Figure 2-10 illustrates the present extent of the groundwater plume.

The source areas at the facility are a collection of processing and former disposal areas, which are currently designated as RCRA SWMUs. The soils in the source areas contain certain VOCs and process-related metals. Like the facility as a whole, the identities of contaminants at individual SWMUs are also well understood. Although the precise spatial

Table 2-10

Previous RCRA Closure Groundwater Investigation (July 1992)
Techalloy, Inc.
Union, Illinois
(Concentrations in μg/L)

Analyte/Chemical	Sample Location			
	MW-04	MW-10	MW-11	Reporting Limited
Inorganics				
Barium	BDL	110	BDL	50
Chromium	56	BDL	BDL	5
Copper	BDL	BDL	220	20
Nickel	31	38	6,000	20
Lead	3.0	BDL	BDL	2
Selenium	BDL	2.1	BDL	2
Nitrate, as N	19,400	660	48,500	50
Sulfate	24,000	BDL	6,600	5,000
Cyanide, total	BDL	BDL	17	10
Organics				
1,2-Dichloroethene (total)	BDL	780	BDL	50
1,1-Dichloroethane	BDL	4,900	12	50
1,1,1-Trichloroethane	690	320,000	190	50
1,1-Dichloroethene	BDL	9,500	BDL	50
Toluene	BDL	240	BDL	50
Xylene (total)	BDL	110	BDL	50
Trichloroethene	BDL	10,000	9	50
Tetrachloroethene	670	4,800	66	50
Methylene chloride	BDL	170	BDL	50
1,1,2-Trichloroethane	BDL	130	BDL	50

CUO - Cleanup objective.
BDL - Below detection limit.
Lab Methods: Volatiles by SW-846 Method 8240. Metals by SW-846 Method 6010, except lead by Method 7421, selenium by Method 7740. Nitrate by EPA 353.2, sulfate by Method 9038, cyanide by Method 9010.
Field Methods: Metals filtered.

distributions of constituents at each SWMU is not known, the general spatial distributions can be estimated from past analytical results.

Only one SWMU, the BG-5 Drum Storage Area, has not been sampled to date.

Eight SWMUs have been identified at the Techalloy facility, three of which are already being addressed under a separate closure plan. Table 2-11 lists the three SWMUs addressed by the separate closure plan. Because the three separate SWMUs are the subject of a separate investigation, this summary of current conditions does not address these three SWMUs in detail. Table 2-12 lists the five SWMUs addressed by the present RFI, which are the focus of the present summary of current conditions.

<u>Wire Slag Disposal Area</u>

The soil at the Wire Slag Disposal Area has been sampled as part of the investigation for the closure of the acid treatment unit. Soil samples (TT-3 and TT-4) were collected on the south side of the building, immediately east and west, respectively, of the Wire Slag Disposal Area. (See Figure 2-11) The soil was analyzed for inorganics, TCLP metals, and VOCs. TCLP metals were analyzed because metals were anticipated and because disposal was expected to be necessary. In preparation for disposal, TCLP metals were analyzed. According to the analyses, levels of methylene chloride, 1,1,1-TCA, PCE, and TCLP barium are present. Only methylene chloride and PCE were reported above the IEPA cleanup objectives. Two confirmatory soil borings will be advanced near the Dumpster[tm] containing the wire slag to determine if soils have been impacted. Section 2 of the Field Sampling Plan details location, analyses, and number of samples for all SWMUs to be investigated. Section 3 of the same plan details all sampling techniques and protocols to be utilized.

<u>BG-5 Drum Storage Area</u>

The BG-5 area is isolated from the previously investigated areas. As a result, no soil or groundwater samples are available in the immediate vicinity of the BG-5. The drums are inspected regularly to assure that they are continuously in good condition. The exact number of drums changes from time to time when waste is generated or shipped. As of March 1994, the area contained ten 55-gallon drums. One drum contained waste chlorinated paraffin. Seven drums contained waste ADS (nitric acid) sludge. Two drums contained used BG-5 (aliphatic petroleum distillate). Although the area has never before been sampled, its historical use is well understood. Because the area has long stored BG-5 waste, the area's soil might contain metals or VOCs.

Five confirmatory soil borings will be advanced near the former BG-5 oil drum staging area to characterize this potential source area. Section 2 of the Field Sampling Plan details locations, analyses and number of samples for all SWMUs to be investigated. Section 3 of the same plan details all sampling techniques and protocols to be used.

Table 2-11

Previous RCRA Closure SWMUs
Techalloy Company, Inc.
Union, Illinois

SWMU	Suspected Constituents	Current Status
Cyanide Tank (also known as Cyanide Destruction Unit)	Cyanide, metals.	Tanks have been abandoned, dismantled, and are undergoing closure.
Acid Pits (also known as Acid House or Acid Pickling House)	Acids, metals.	Pits have been retrofitted, are still in use, and are undergoing RCRA closure.
Acid Treatment Unit	Acids, metals.	Unit is no longer in use. Tanks have been abandoned, dismantled, and are undergoing closure.

Table 2-12

SWMUs Addressed by the Present RFI
Techalloy Company, Inc.
Union, Illinois

SWMU	Suspected Constituents	Current Status
Wire Slag Disposal Area	VOCs, metals (especially barium).	Actively used as a forklift driveway and a dumpster holding area for a single dumpster. The dumpster contains only solids. The area is paved to prevent infiltration.
BG-5 Drum Storage Area	VOCs, metals.	Inactive. Used to store discarded containers unrelated to BG-5.
Concrete Evaporation Pad	VOCs (especially PCE and 1,1,1-TCA), metals (specifically, lead and barium).	Inactive since 1978. Soil may harbor residual constituents serving as continuing source.
Spent Acid Holding Pond (also known as Settling Pond)	VOCs, metals (especially chromium).	Inactive since 1980.
Plating Wastewater Disposal Area	VOCs, metals, cyanide.	Inactive since 1979.

Table 2-12.1

**VOC Project Target Parameters
Techalloy Company, Inc.
Union, Illinois**

Compounds

Acetone*
Benzene*
Bromodichloromethane
Bromoform
Bropmomethane
2-Butanone*
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
1,1-Dichloroethane*
1,2-Dichloroethane*
1,1-Dichloroethene
1,2-Dichloroethene (cis and trans)*
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene*
2-Hexanone
Methylene chloride*
4-Methyl-2-pentanone
Styrene
1,1,2,2-Tetrachloroethane
Tetrachloroethene*
Toluene*
1,1,1-Trichloroethane*
1,1,2-Trichloroethane*
Trichloroethene*
Vinyl chloride*
Xylene*

Level??

*Chemical specified in IEPA's Cleanup Objectives for Techalloy, Inc., 7 October 1991.
Note: All action levels are as agreed at the pre-QAPP (23 March 1993).

Table 2-12.2

SVOC Project Target Parameters
Techalloy Company, Inc.
Union, Illinois

Compounds

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Benzo(g,h,i)perylene
Benzyl butyl phthalate
Bis(2-chloroethyl)ether
Bis(2-chloroethoxy)methane
Bis(2-ethylhexyl)phthalate
Bis(2-chloroisopropyl)ether
4-Bromophenyl phenyl ether
Carbazole
4-Chloroaniline
2-Chloronaphthalene
4-Chloro-3-methylphenol
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene
Dibenzo(a,h)anthracene
Dibenzofuran
Di-n-butylphthalate
1,2-Dichlorobenzene
1,3-Dichloroenzene
1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
Diethyl phthalate
2,4-Dimethylphenol
Diethyl phthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocylopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
2-Methylnaphthalene
2-Methylphenol (o-Cresol)
4-Methylphenol (m-Cresol)
Naphthalene
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
Nitrobenzene
2-Nitrophenol
4-Nitrophenol
N-Nitrosodiphenylamine
N-Nitroso-di-n-propylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

Note: All action levels are as agreed at the pre-QAPP meeting (23 March 1993).

Table 2-12.3

Inorganic Project Target Parameters
Techalloy Company, Inc.
Union, Illinois

Metals (App. IX)

Antimony
Arsenic
Barium*
Beryllium
Cadmium*
Calcium
Chromium*
Cobalt
Copper*
Lead*
Mercury*
Nickel*
Potassium
Selenium*
Silver
Sodium
Thallium
Tin
Vanadium
Zinc

Other Inorganics

Ammonia
Chloride
Nitrate*
Sulfate*

Cyanide*

Total Suspected Solids

*Chemical specified in IEPA's Cleanup Objectives for Techalloy, Inc., 7 October 1991.
Note: All action levels are as agreed at the pre-QAPP meeting (23 March 1993).

Concrete Evaporation Pad Area

A soil boring (SB-12, also identified as SS-01) is located near the Concrete Evaporation Pad. The soil was analyzed for VOCs. The analyses indicate an influence from the SWMU. Detected analytes include 1,1-DCE, 1,1-DCA, 1,1,1-TCA, TCE, 1,1,2-TCA, PCE, toluene, ethylbenzene, and xylenes. 1,1,1-TCA was detected at a concentration of 1,000,000 μg/kg. PCE was also .detected at a concentration of 870,000 μg/kg. It is suspected that the Concrete Evaporation Pad is the primary origin of the groundwater plume migrating northwestward from the facility (Figure 2-10).

Soil boring SB-12 was also analyzed for TPH, inorganics, and metals. Concentrations of TPH, lead, and barium were detected.

Ten confirmatory soil borings will be advanced in and around the concrete evaporation pad to confirm and determine the magnitude and lateral and vertical extent of constituent migration from this potential source area. Section 2 of the Field Sampling Plan details location, analyses, and number of samples for all SWMUs to be investigated. Section 3 of the same plan details all sampling techniques and protocols to be used.

Spent Acid Holding Pond Area

A soil boring (SB-05) is located in the Spent Acid Holding Pond (also known as the Settling Pond). The soil was analyzed for inorganics, TPH and metals. The laboratory results suggest that concentrations of chromium occur within the soil of the pond but TPH was not detected. The soil concentrations of other metals and inorganics appear to be of little concern.

A headspace analysis was performed on a groundwater probe sample (WS-8) at the Spent Acid Holding Pond. The mobile laboratory GC determined that the headspace gas contained levels of 1,1,1-TCA and PCE.

Fifteen confirmatory soil borings will be advanced in and around the former holding pond to confirm and characterize the magnitude and lateral and vertical extent of potential constituent migration from this potential source area. Section 2 of the Field Sampling Plan details location, analyses, and number of samples for all SWMUs to be investigated. Section 3 of this same plan details all sampling techniques and protocols to be used.

Plating Wastewater Disposal Area

A groundwater monitoring well (MW-10) is located in the Plating Wastewater Disposal Area. The water from MW-10 has been analyzed for inorganics and VOCs. The analyses indicate that the water contains levels of 1,2 DCE, 1,1-DCA, 1,1,1-TCA, 1,1-DCE, toluene, xylenes, TCE, PCE, methylene chloride, and 1,1,2-TCA.

Laboratory data shows that metals and cyanide do not seem to have affected the groundwater; however, metals or cyanide may be present in the soil.

Four confirmatory soil borings will be advanced near the plating wastewater discharge area to confirm and determine the magnitude and lateral and vertical extent of potential constituent migration from this potential source area. Section 2 of the Field Sampling Plan details location, analyses, and number of samples for all SWMUs to be investigated. Section 3 of the same plan details all sampling techniques and protocols to be used.

Migration Pathways

The migration pathway of concern is the transport of constituents in groundwater. Airborne transport and surface water runoff are of relatively little concern, because the facility is partially covered with buildings, and some of the remaining area is paved. Unpaved areas do cover a large area of the facility, but the facility occasionally places sand and gravel over unpaved surfaces to facilitate operations. The facility is surrounded by a security fence to prevent access.

During prior investigations, WESTON monitored for airborne organic constituents using field instruments. The monitoring detected no elevated levels of organic constituents. The monitoring confirms the expectation that the airborne pathway is of little concern.

Groundwater is the principal pathway of concern. The groundwater is known to contain certain VOCs and process-related metals. Numerous groundwater samples have been collected downgradient of the Techalloy property and are summarized in Figure 2-10. Based on analyses of the groundwater, it appears that VOCs are the primary constituents transported. The variations in transport are due to the transport characteristics of the constituents.

Based on numerous observations of downgradient groundwater quality, it is possible to draw several conclusions regarding the groundwater pathway. The following conclusions regard VOCs, SVOCs, and metals:

- VOCs are present in the groundwater plume, which is migrating beyond the property. Figure 2-10 illustrates the plume. A report by WESTON provides extensive documentation of this migration pathway. (WESTON, *Phase II Soil and Groundwater Investigation: Techalloy Company, Union, Illinois*, June 1991.)

- SVOCs are not migrating in the groundwater. The facility has no history of SVOC usage, and none were found on site during previous investigations. Furthermore, a downgradient monitoring well (MW-7) directly in the constituent plume was tested for SVOCs and indicated no detections (Figure 2-10).

- Metals are present, but are not migrating off site. Although monitoring wells and soil samples at the source areas display significant levels of metals, the monitoring wells downgradient do not. For instance, the monitoring wells at the northwest corner of the property appear unaffected. Monitoring wells, such as MW-7 (Figure 2-10), were analyzed for metals and no metals of potential concern were detected.

<u>Potential Receptors</u>

Presently, only a limited number of potential receptors exist, none of which are related to municipal water wells. The potential receptors are restricted to residential water wells.

Several present and former community water wells are nearby, but they are not receptors. The Village has installed a new production well (Well No. 4) for the community water system. The new water well lies far outside the potential extent of the groundwater plume, and also extracts water from a much deeper stratum than the stratum in which the groundwater plume lies. The active Village well (Well No. 4) was tested for VOCs in January 1990, and neither TCE nor 1,1,1-TCA were detected.

An inactive Village well (Well No. 3) exhibited elevated levels of ammonia, sulfates, chlorides, sodium and potassium. (PRC Consultants, *Preliminary Assessment: Techalloy Illinois, Inc.*, 8 November 1991.) The reported constituents found at the inactive well are not representative of the Techalloy plume's constituents. Inorganics were observed at the well, while the plume emanating from Techalloy consists of VOCs, Southern California Chemical, whose facility is located southwest of the Techalloy facility, has been identified as a potential source of inorganic contamination. The well ceased production in 1987. (*Ibid.*) Therefore, it would appear that the constituents detected in Well No. 3 did not originate from Techalloy.

Seventeen residential wells were tested for VOCs on various occasions from June 1990 to September 1991. Six of the wells had detectable concentrations of VOCs; however, only one well exceeded an MCL, exhibiting TCE at a concentration above 5.0 $\mu g/L$. The residential well sampling history and planned sampling events are presented in the document *Private Well Sampling Plan: Techalloy Company, Union, Illinois*, May 1993 (Appendix F). All procedures for investigative activities QA/QC, and report preparation contained in this document that are applicable and relevant to any portion of the Private Well Sampling Plan (PWSP) and its related activities are considered part of the PWSP and will be implemented accordingly, unless otherwise stated in the PWSP.

2.3 PROJECT SCOPE AND OBJECTIVES

The RFI focuses on five subject SWMUs:

- Wire Slag Disposal Area.
- BG-5 Drum Storage Area.

- Spent Acid Holding Pond.
- Plating Wastewater Disposal Area.
- Concrete Evaporation Pad.

The purpose of the RFI is to gather sufficient information to determine the vertical and horizontal extent and magnitude of constituents in the five SWMUs, assess potential releases from the five SWMUs, determine the vertical and lateral extent and magnitude of constituent migration in groundwater, and to develop and evaluate viable remedial alternatives in a Corrective Measures Study (CMS) at the facility.

- Determine the Vertical and Horizontal Extent and Magnitude of Constituents. Soil samples exhibiting concentrations of VOCs above cleanup objectives or metals above background will define the affected areas. (See the FSP for the locations and numbers of samples to be collected.) Sufficient information will have been gathered if the sample locations encompass the affected areas. The vertical and horizontal extent and magnitude of constituents will influence selection of corrective measures for soil, because each technology is best suited to certain types of chemicals. If a Phase II study were necessary, Phase I data would be plotted and tabulated together with the Phase II data.

- Assess Potential Releases from the Five SWMUs. Nearby groundwater samples exhibiting concentrations of VOCs above cleanup objectives or metals above background will define releases. (See the FSP for the locations and numbers of samples to be collected.) Sufficient information will have been gathered if the sample locations encompass the releases. The presence of releases will influence the selection of corrective measures for groundwater because each technology is best suited to certain types of chemicals. If a Phase II study were necessary, Phase I data would be plotted and tabulated together with the Phase II data.

- Determine the Vertical and Lateral Extent and Magnitude of Constituent Migration in Groundwater. Distant groundwater exhibiting concentrations of VOCs above cleanup objectives or metals above background will define the extent and magnitude of groundwater migration. (See the FSP for the locations and numbers of samples to be collected. See Section 2 of the QAPP for the locations and results of previous work. Figure 2-10 concisely summarizes the previous work. Sufficient information will have been gathered if the old plus new samples encompass the affected groundwater. The extent of migration will influence the selection of corrective measures for groundwater because each technology is best suited for certain types of chemicals and certain degrees of areal extent. If a Phase II study were necessary, Phase I data would be plotted and tabulated together with the Phase I data and existing data.

- Develop and Evaluate Remedial Alternatives. As discussed in the preceding bulleted items, the selection and design of corrective measures depends on the constituents and their distribution. The initial sections of the CMS will digest the data from all investigations to develop a conceptual model of each of the SWMUs. If Phase II investigations were required, their results would be incorporated into the conceptual model, too.

The objective of the CMS is to develop and evaluate appropriate remedial action alternatives based on the RFI data.

WESTON will use an integrated and phased approach for the RFI/CMS. In this approach, the RFI and CMS will be conducted concurrently, with data collected in the RFI influencing the development of remedial alternatives in the CMS, which in turn will affect the data needs and scope of additional phases of field investigations. The Phase I investigation will integrate existing data with the RFI's new information.

The Phase I field investigation will include:

- Shallow soil (1 to 2 feet bgs) sampling. Used for verification and site characterization in and around the five subject SWMUs. Will help to define areas requiring corrective action. Will also be used for establishing background concentrations of metals away from the Techalloy facility.

- Deep subsurface soil sampling (5 to 6 feet bgs). Used for verification and site characterization in and around the five subject SWMUs. Will help to define the depth of corrective actions. Will also be used for establishing background concentrations of metals away from the Techalloy facility.

- Groundwater sampling. Used for verification and site characterization in and around the five subject SWMUs. Will also be used for establishing background concentrations away from the Techalloy facility.

WESTON will evaluate data qualitatively and statistically. The most likely statistical comparison would use the Student-*t* statistic. If background samples are approximately normally distributed, the *t* statistic will be used to compute a 95-percent confidence interval on background concentrations. The procedure for computing a 95 percent confidence interval can be found in almost any elementary statistics book (see, e.g., Miller and Freud, *Probability and Statistics for Engineers*, Second Edition, Prentice-Hall, 1977.) The data will be evaluated in conjunction with existing data to determine whether a Phase II investigation is necessary. The rationale and scope of any Phase II investigation will be discussed with and approved by the U.S. EPA prior to implementation.

Potential Phase II work may include the following activities:

- Additional soil sampling.
- Additional groundwater sampling.
- Additional monitoring well installation.
- Treatability studies or pilot testing.

If Phase I data suggest that sufficient site characterization information has been collected, then WESTON may proceed with the risk assessment for the facility. A technical memorandum presenting the Phase I data and recommendations of the risk assessment will be prepared and submitted to the U.S. EPA. After a review of the technical memorandum, the need for implementing a Phase II investigation will be evaluated in light of the data requirements for the CMS.

2.4 SAMPLE NETWORK DESIGN AND RATIONALE

Section 2 of the Field Sampling Plan (FSP) (see Appendix A) describes the sample network design and rationale for sample locations in detail.

2.5 PARAMETERS TO BE TESTED AND FREQUENCY

levels?

Tables 2-12.1 through 2-12.3 present the project target parameters. The parameters are grouped according to whether they are VOCs, SVOCs, or inorganics. Some of the parameters are derived from IEPA's list of cleanup objectives (IEPA, 7 October 1991), which is incorporated in its entirety. The IEPA's list is consistent with the chemical processes and raw materials used. The remaining chemicals are targeted on a purely precautionary basis. Based on available information, the list of project target parameters encompasses and, indeed, exceeds the list of process-related compounds at the facility.

Soil samples collected in and around each of the five subject SWMU areas will be analyzed for volatile organics (VOCs), semivolatile organics (SVOCs), metals and other inorganics. Soil samples collected in proximity to the plating waste water disposal area will also be analyzed for cyanide because cyanide was associated with this SWMU.

Soil samples collected from one boring designated as one of the concrete evaporation pad borings (CP-03) will be analyzed for the plating wastewater parameters and is counted with the plating wastewater samples in Table 2-13, and not with the concrete evaporation pad samples. The location of this boring is common to both SWMU areas and the plating wastewater parameters encompass the concrete evaporation pad parameters (Table 2-13), and therefore, these analyses will determine the impact from either of these SWMU areas at this location.

Semivolatile organics (SVOCs) have not been part of Techalloy's operations and are, therefore, not anticipated to be present in site soils or groundwater. As a confirmation measure the soil and groundwater will be assessed for SVOCs at each of the five SWMU locations.

The groundwater pathway will also be assessed at each SWMU location for the presence of VOCs, metals, other inorganics and total suspended solids (TSS). This assessment will determine the potential impact of each individual SWMU to groundwater. Groundwater will not be analyzed for cyanide because previous groundwater analysis at Well MW-10, located in the plating wastewater area where cyanide could potentially be present, determined that cyanide has not impacted the groundwater at this location. Therefore, cyanide analysis of groundwater at the other four SWMU locations, where cyanide was not present, is not necessary.

The existing monitoring wells will be sampled for analyses of VOCs, metals, other inorganics, and TSS. The monitoring well groundwater will not be analyzed for SVOCs, as these constituents have not been used on site and groundwater samples from each potential source area or SWMU will be analyzed for SVOCs.

Background soil samples will be collected for metals and SVOCs. Table 2-13 specifies the quantity of background soil samples. Figure 2-3 of the FSP specifies the locations. Groundwater samples from the background locations will be analyzed for VOCs, SVOCs, metals, and TSS. Table 2-13 specifies the quantity of background groundwater samples. Figure 2-3 of the FSP specifies the locations. The background results will assist in determining the significance of on site detections. As explained in the FSP, the background concentrations will be compared statistically to concentrations detected on site to establish the significance of the on-site concentrations. Assuming a roughly normal distribution, the *t*-statistic will be used to provide a 95 percent confidence interval or background concentrations.

Sample matrices, analytical parameters, and frequencies of sample collection are presented in Table 2-13. An explanation of sampling locations is presented in Subsection 2.2 of the FSP. No field parameters are called for, aside from routine safety parameters, pH, conductivity, temperature, and head.

2.6 DATA QUALITY OBJECTIVES

Data Quality Objective (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions made during RFI/CMS activities and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. There are five analytical levels which address various data uses and the QA/QC effort and methods required to achieve the desired level of quality:

- Screening (DQO Level I): This provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at the site, preliminary comparison to ARARs, initial site characterization to locate areas for subsequent and more accurate analyses, and for engineering screening of alternatives (bench-scale tests). These types of data include those generated on site through the use of pH, conductivity, and temperature at the site.

- Field Analyses (DQO Level II): This provides rapid results and better quality than Level I. This level may include mobile lab-generated data depending on the level of quality control exercised.

Table 2-13

Summary of Sampling Effort
Techalloy Company, Inc.
Union, Illinois

Sample Matrix	Field Parameters	Laboratory Parameters (as defined at QAPP Table 2-12.1 to 2-12.3)	Investigative			Field Duplicate			Field Blank			Matrix Spike/ Matrix Spike Duplicate[1]			Matrix Total[2]
			No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	
Phase I															
SWMU Soil Borings															
Wire Slag Disposal Area	Description and classification	VOCs	4	1	4	1	1	1	—	—	—	1	1	1	5
		Metals	4	1	4	1	1	1	—	—	—	—	—	—	5
BG-5 Oil Drum Storage Area	Description and classification	VOCs	10	1	10	1	1	1	—	—	—	1	1	1	11
		SVOCs	5	1	5	1	1	1	—	—	—	1	1	1	6
		Metals	10	1	10	1	1	1	—	—	—	—	—	—	11
Spent Acid Holding Pond	Description and classification	VOCs	27	1	27	3	1	3	—	—	—	2	1	2	30
		Inorganics	27	1	27	3	1	3	—	—	—	—	—	—	30
		Metals	27	1	27	3	1	3	—	—	—	—	—	—	30
Plating Wastewater Disposal Area[3]	Description and classification	VOCs	10	1	10	1	1	1	—	—	—	1	1	1	11
		Metals	10	1	10	1	1	1	—	—	—	—	—	—	11

Table 2-13

Summary of Sampling Effort
Techalloy Company, Inc.
Union, Illinois
(Continued)

Sample Matrix	Field Parameters	Laboratory Parameters (as defined at QAPP Table 2-12.1 to 2-12.3)	Investigative			Field Duplicate			Field Blank			Matrix Spike/ Matrix Spike Duplicate[1]			Matrix Total[2]
			No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	
Plating Wastewater Disposal Area (cont.)	Description and classification (cont.)	CN	10	1	10	1	1	1	—	—	—	—	—	—	11
Concrete Evaporation Pad[3]	Description and classification	VOCs	18	1	18	2	1	2	—	—	—	1	1	1	20
		SVOCs	9	1	9	1	1	1	—	—	—	1	1	1	10
		Metals	18	1	18	2	1	2	—	—	—	—	—	—	20
Background soils	Description and classification	Metals	6	1	6	1	1	1	—	—	—	—	—	—	7
		SVOCs	6	1	6	1	1	1	—	—	—	—	—	—	7
SWMU Groundwater															
Wire slag disposal area	pH, temperature, specific conductance	VOCs	1	1	1	—	—	—	—	—	—	—	—	—	1
		SVOCs	1	1	1	—	—	—	—	—	—	—	—	—	1
		Metals-filtered	1	1	1	—	—	—	—	—	—	—	—	—	1
		Metals-unfiltered	1	1	1	—	—	—	—	—	—	—	—	—	1
		TSS	1	1	1	—	—	—	—	—	—	—	—	—	1

Table 2-13

Summary of Sampling Effort
Techalloy Company, Inc.
Union, Illinois
(Continued)

Sample Matrix	Field Parameters	Laboratory Parameters (as defined at QAPP Table 2-12.1 to 2-12.3)	Investigative			Field Duplicate			Field Blank			Matrix Spike/ Matrix Spike Duplicate[1]			Matrix Total[2]
			No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	
BG-5 oil drums	pH, temperature, specific conductance	VOCs	1	1	1	—	—	—	—	—	—	—	—	—	1
		SVOCs	1	1	1	—	—	—	—	—	—	—	—	—	1
		Metals-filtered	1	1	1	—	—	—	—	—	—	—	—	—	1
		Metals-unfiltered	1	1	1	—	—	—	—	—	—	—	—	—	1
		TSS	1	1	1	—	—	—	—	—	—	—	—	—	1
Spent acid holding pond	pH, temperature, specific conductance	VOCs	5	1	5	1	1	1	1	1	1	1	1	1	7
		SVOCs	1	1	1	1	1	1	1	1	1	1	1	1	1
		Inorganics	5	1	5	1	1	1	1	1	1	—	—	—	7
		Metals-filtered	5	1	5	1	1	1	1	1	1	—	—	—	7
		Metals-unfiltered	5	1	5	1	1	1	1	1	1	—	—	—	7
		TSS	5	1	5	1	1	1	1	1	1	—	—	—	7
Plating wastewater disposal area[3]	pH, temperature, specific conductance	VOCs	1	1	1	—	—	—	—	—	—	—	—	—	2
		SVOCs	1	1	1	—	—	—	—	—	—	—	—	—	1
		Metals-filtered	1	1	1	—	—	—	—	—	—	—	—	—	1

Table 2-13

Summary of Sampling Effort
Techalloy Company, Inc.
Union, Illinois
(Continued)

Sample Matrix	Field Parameters	Laboratory Parameters (as defined at QAPP Table 2-12.1 to 2-12.3)	Investigative			Field Duplicate			Field Blank			Matrix Spike/ Matrix Spike Duplicate[1]			Matrix Total[2]
			No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	
Plating wastewater disposal area (cont.)	pH, temperature, specific conductance (cont.)	Metals-unfiltered	1	1	1	—	—	—	—	—	—	—	—	—	1
		TSS	1	1	1	—	—	—	—	—	—	—	—	—	1
Concrete evaporation pad	pH, temperature, specific conductance (cont.)	VOCs	2	1	2	—	—	—	—	—	—	—	—	—	2
		SVOCs	1	1	1	—	—	—	—	—	—	—	—	—	1
		Metals-filtered	2	1	2	—	—	—	—	—	—	—	—	—	2
		Metals-unfiltered	2	1	2	—	—	—	—	—	—	—	—	—	2
		TSS	2	1	2	—	—	—	—	—	—	—	—	—	2
Groundwater															
Existing monitoring wells and probe sample near SW-21	pH, temperature, specific conductance	VOCs	14	1	14	2	1	2	2	1	2	1	1	1	18
		Inorganics[4]	3	1	3	1	1	1	—	—	—	—	—	—	4
		Metals-filtered	13	1	13	2	1	2	2	1	2	—	—	—	17
		Metals-unfiltered	13	1	13	2	1	2	2	1	2	—	—	—	17

Table 2-13

Summary of Sampling Effort
Techalloy Company, Inc.
Union, Illinois
(Continued)

Sample Matrix	Field Parameters	Laboratory Parameters (as defined at QAPP Table 2-12.1 to 2-12.3)	Investigative			Field Duplicate			Field Blank			Matrix Spike/ Matrix Spike Duplicate[1]			Matrix Total[2]
			No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	No.	Freq.	Total	
Existing monitoring wells and probe sample near SW-21 (cont.)	pH, temperature, specific conductance (cont.)	TSS	13	1	13	2	1	2	2	1	2	—	—	—	17
Background groundwater	pH, temperature, specific conductance	VOCs	6	1	6	1	1	1	1	1	1	1	1	1	8
		SVOCs	6	1	6	1	1	1	1	1	1	1	1	1	8
Background groundwater (cont.)	pH, temperature, specific conductance (cont.)	Metals-filtered	6	1	6	1	1	1	1	1	1	—	—	—	8
		Metals-unfiltered	6	1	6	1	1	1	1	1	1	—	—	—	8
		TSS	6	1	6	1	1	1	1	1	1	—	—	—	8
Phase II															
Soil and Groundwater															
New monitoring wells	pH, temperature, specific conductance	Dependent on Phase I results													
Matrix, number, and analyses dependent on Phase I results															

Table 2-13

Summary of Sampling Effort
Techalloy Company, Inc.
Union, Illinois
(Continued)

[1]MS/MSDs are not additional samples, but are instead investigative samples on which MS/MSD analyses are performed. MS/MSD analyses are for organic samples only. Duplicate/spike analyses will be performed for inorganic samples.

[2]The matrix total does not include trip blank samples, MS/MSDs and duplicate/spike samples. One trip blank sample will be shipped with every shipment container of VOA samples.

[3]Two soil samples from boring CP-03 (Concrete Evaporation Pad area) will be analyzed for the plating wastewater disposal area parameters due to the proximity of the wastewater area. The analyses of these two samples are included with the plating wastewater disposal area samples.

[4]Inorganics to be analyzed at MW-5, MW-5D, and MW-7.

- <u>Engineering</u> (DQO Level III): This provides and intermediate level of data quality and is used for site characterization. Engineering analyses may include mobile-lab-generated data and some analytical lab methods (e.g., laboratory data with quick turnaround used for screening but without full quality control documentation).

- <u>Confirmational</u> (DQO Level IV): This provides the highest level of data quality and is used for purposes of risk assessment, evaluation of remedial alternatives, and Potential Responsible Party (PRP) determination. These analyses require full Contract Laboratory Program (CLP)/SW846 analytical and data validation procedures in accordance with U.S. EPA-recognized protocol.

- <u>Non-Standard</u> (DQO Level V): This refers to analyses by non-standard protocols, for example, when exacting detection limits or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of quality control is usually similar to DQO Level IV data.

Table 2-14 presents the DQO summary for each type of data to be generated under this QAPP for the Techalloy RFI. The DQO table specifies the intended data use for each data-generation activity.

2.7 PROJECT SCHEDULE

WESTON plans to collect samples for Phase I of the RFI in late summer 1993. Figure 2-12 illustrates the schedule.

Table 2-14

Data Quality Objectives
Techalloy Company, Inc. RFI
Union, Illinois

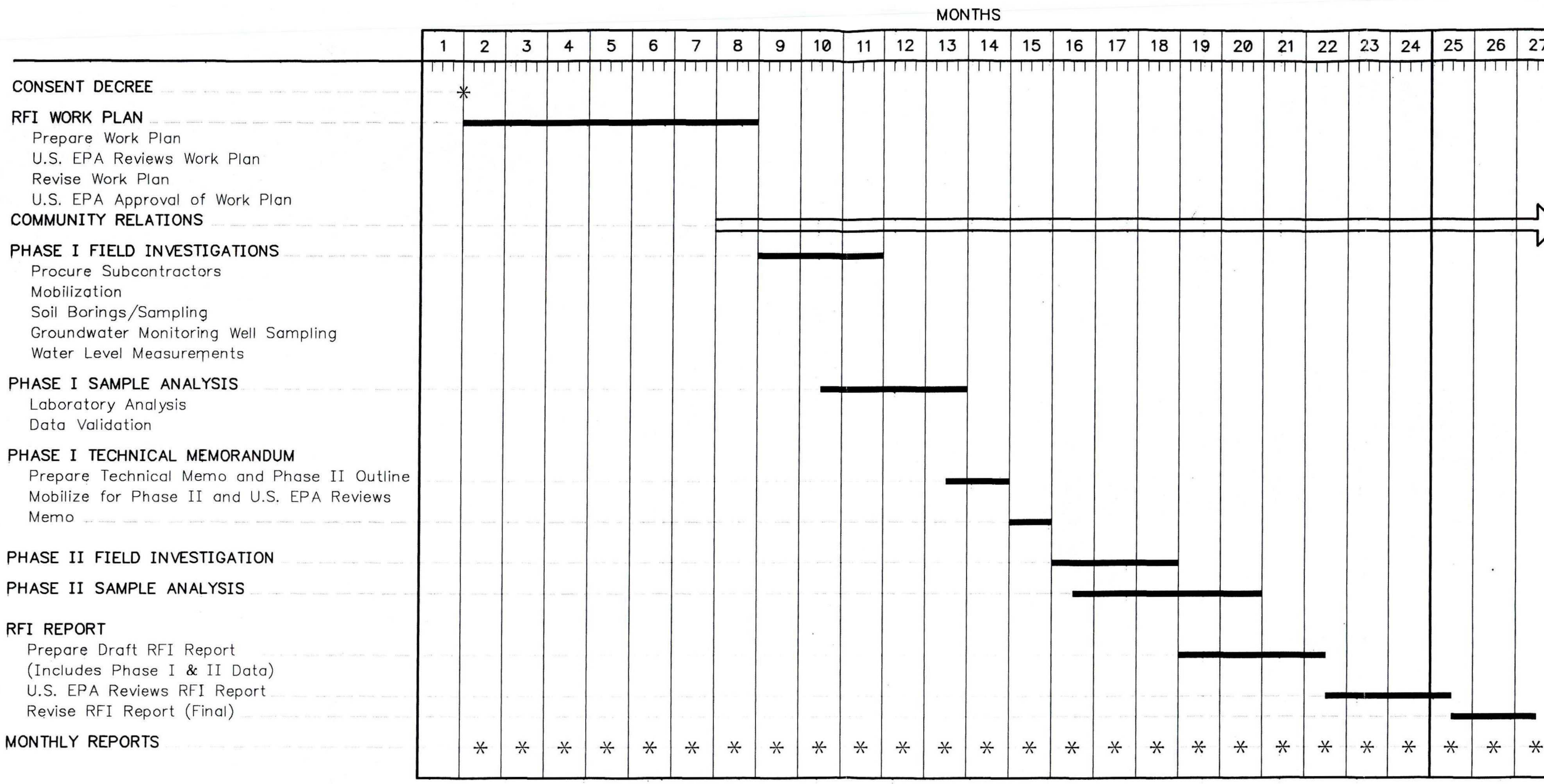
Data Quality Objective	Task	Data Collection Activity	Data Type	Data Use	Analytical Level
Source Characterization	Soil Sampling	Logging of soils	Soil description and classification	SC, EA, SP	I
		Collect and analyze soil samples	VOCs, metals, cyanide	SC, EA	IV
Pathway Characterization	Groundwater Sampling On-Site	Field parameter evaluation	pH, conductivity, temperature	SP	I
		Collect and analyze groundwater samples	VOCs, SVOCs, metals	SC, EA	IV
			TSS	SC, EA	V
	Determine groundwater flow conditions on- and off-site	Water level measurements	Hydraulic head	SC, SP	I
Extent of Volatile Constituent Migration	Groundwater sampling downgradient of suspect source areas and on- and off-site	Collect and analyze groundwater samples	VOCs, SVOCs, metals	SC, EA	IV
			TSS	SC, EA	V
		Field parameter evaluation	pH, conductivity, temperature	SP	I

Notes and Abbreviations:

Data Use Symbols:
SC - Site Characterization
EA - Engineering Evaluation
SP - Sampling Protocol

Analytical Levels:
I - Qualitative Screening with Field Instruments
II - Field Analysis with Field Instruments
III - Off-Site Analysis by Analytical Laboratory
IV - Analyses by Routine Methods
V - Analyses by Special Methods

Need to be revised



NOTES: (1) The duration of document review is at the Agency's discretion. For purposes of this schedule, WESTON has assumed two months for the first review and one month for the second review and approval. The schedule will be updated to reflect the Agency's actual review time.

(2) The Phase II activities are contingent upon the results of the Phase I activities. The duration of the Phase II investigation can not currently be defined.

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FIGURE 2-12

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

RFI PROJECT SCHEDULE

TECHALLOY COMPANY, INC.
Union, Illinois

SECTION 3

PROJECT ORGANIZATION AND RESPONSIBILITIES

As outlined in the Consent Decree, Techalloy, Inc., will develop and implement the RFI/CMS for the Techalloy Facility. Techalloy, Inc., has retained WESTON to develop the planning documents and to execute the work. All activities will be performed in close coordination with U.S. EPA Region V.

Key responsibilities of personnel are discussed below. The responsibilities fall into four general areas: project management, quality assurance (QA), field operations, and laboratory operations. Figure 3-1 presents the organization chart for the project.

3.1 PROJECT MANAGEMENT

3.1.1 U.S. EPA Region V RCRA Project Coordinator

The U.S. EPA RCRA Project Coordinator for the Techalloy RFI/CMS is Mr. William Buller. The U.S. EPA RCRA Project Coordinator has the overall responsibility for all phases of the RFI/CMS.

3.1.2 WESTON Project Director

WESTON has assigned Mr. John W. Thorsen, P.E., as the Project Director for the project. The Project Director has overall responsibility for all facility-related tasks performed under the present QAPP. The Project Director is responsible for ensuring that the project meets U.S. EPA's and Techalloy's objectives and quality standards. He is also responsible for ensuring that all work is executed in accordance with U.S. EPA's technical directives. The WESTON Project Director is responsible for assigning and monitoring the functions of WESTON's Project Manager.

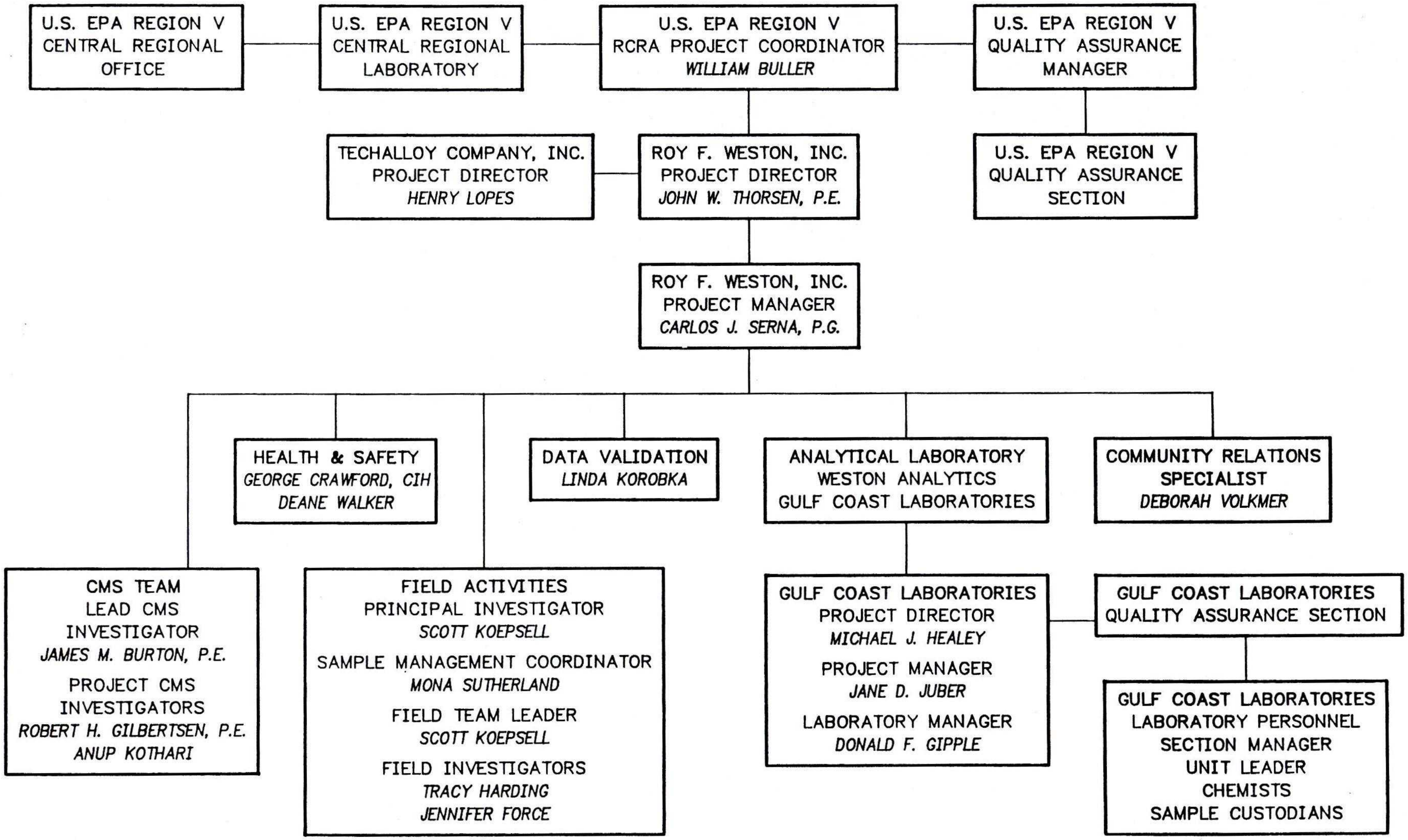

FIGURE 3-1

WESTON
MANAGERS DESIGNERS/CONSULTANTS

Three Hawthorn Parkway
Vernon Hills, Illinois
60061

PROJECT ORGANIZATION

TECHALLOY COMPANY, INC.
Union, Illinois

RWS-09/01/93-11:02-CAD93\300\30093

3.1.3 WESTON Project Manager

WESTON has assigned Mr. Carlos J. Serna, P.G., as Project Manager for the facility. WESTON's Project Manager is responsible for implementing the project, and has the authority to commit the resources necessary to meet the project objectives and requirements. The Project Manager's primary function is to ensure that the technical, financial, and scheduling objectives are achieved successfully. WESTON's Project Manager will work cooperatively with WESTON's Project Director and U.S. EPA's RCRA Project Coordinator. WESTON's Project Manager's other responsibilities include coordinating and managing personnel, scheduling the project, coordinating and reviewing deliverables, and maintaining general quality assurance of fieldwork.

3.1.4 WESTON Project Personnel

WESTON has assigned Ms. Deborah Volkmer as the Manager of Community Relations activities. The Manager of Community Relations will be responsible for the implementation of all community relations activities.

WESTON has assigned Mr. James M. Burton as the Lead CMS Investigator. The Lead CMS Investigator is responsible for implementing the CMS and has the authority to commit the resources necessary to meet the CMS objectives and requirements. The Lead CMS Investigator's primary function is to ensure that the technical, financial, and scheduling objectives area achieved successfully.

WESTON has assigned Mr. Robert H. Gilbertsen as the Lead Project CMS Investigator. the Lead Project CMS Investigator will be responsible for implementing and overseeing the day to day activities of the CMS.

WESTON has assigned Mr. Anup Kothari as the Project CMS Investigator. The project CMS Investigator will be responsible for the performance of the day to day CMS activities.

3.1.5 Techalloy Project Director

Techalloy has assigned Mr. Henry Lopes as Project Director for the project. Mr. Lopes will work with WESTON to ensure that the project meets the U.S. EPA's and WESTON's technical objectives.

3.2 QUALITY ASSURANCE

All aspects of the Techalloy RFI/CMS are subject to review and approval by U.S. EPA Region V and WESTON. The specific quality assurance tasks and responsibilities are summarized below.

3.2.1 Review and Approval of the QAPP

WESTON

QA for activities associated with the Techalloy RFI/CMS will be performed by the WESTON Quality Assurance Manager, Robert C. Brod, P.G. The Quality Assurance Manager will review the Techalloy facility QAPP before submitting the document to U.S. EPA.

U.S. EPA Region V

The U.S. EPA Region V Environmental Sciences Division (specifically the Quality Assurance Section and the Central Regional Laboratory) shall review the draft and revised Techalloy facility QAPP. This division shall provide recommendations for approval to the U.S. EPA Region V Quality Assurance Manager (QAM). The U.S. EPA Region V QAM has the responsibility to approve all QAPPs. In addition, the U.S. EPA RCRA Project Coordinator will review and approve the QAPP.

3.2.2 Validation of Analytical Data

Techalloy facility analytical data will be validated by trained WESTON validation personnel. WESTON's personnel will perform the validation in accordance with the procedures described in Section 10 of this QAPP.

3.2.3 Performance and System Audits

External field audits of the Techalloy RFI/CMS are the responsibility of the U.S. EPA Region V Central Regional Laboratory, Laboratory Scientific Support Section (LSSS), and/or Central District Office. Internal field audits are the primary responsibility of WESTON's Project Director and Project Manager. U.S. EPA Region V's Central Regional Laboratory is responsible for performing external laboratory audits. WESTON's Project Manager or his designee is responsible for performing internal laboratory audits.

3.2.4 Final Assessment of Quality Assurance Objectives

WESTON's Quality Assurance Manager, Robert C. Brod, P.G., and U.S. EPA Region V's RCRA Project Coordinator will jointly assess the validated data to determine whether the data have met the QA objectives.

3.2.5 Evidence Audits of Field Records

U.S. EPA Region V's Central Regional Laboratory has the responsibility of conducting external evidence audits of field records. WESTON's Project Manager or his designee will perform internal evidence audits of field records.

3.2.6 Internal Quality Assurance Review and Approval of Reports, Standard Operating Procedures, and Field Activities

WESTON's QA Manager will review all necessary reports and procedures that can affect the quality of data for the planned activities at the facility. WESTON's QA Manager will audit the implementation of this QAPP's QA program. By doing so, they will ensure conformance with WESTON's, Techalloy's, and U.S. EPA's requirements for the project. WESTON's Field Team Leader will report the status of the QA program to WESTON's QA Manager on a regular basis. WESTON's QA Manager will provide QA technical assistance to the field and project staff during development and implementation of the QA plan.

3.2.7 Approval of Laboratory Analytical Procedures

The U.S. EPA Region V CRL and U.S. EPA Region V QAM must approve all laboratory analytical procedures.

3.3 FIELD OPERATIONS

WESTON's field team will operate under the direction of WESTON's Project Manager whenever conducting field activities identified in this QAPP, except for exceptions explicitly identified in this QAPP. The identified activities include sample collection, field measurements, sample packaging, sample shipment, and chain-of-custody procedures. The field team will include personnel from WESTON's pool of corporate resources. In certain circumstances, the field team will include qualified subcontractors. WESTON's Project Manager will assign personnel prior to the start of sampling work. The field team will include personnel in at least three roles:

- Field Team Leader (FTL). The FTL is responsible for the management of the field team and the supervision of all field activities in the absence of WESTON's Project Manager.

- Site Health and Safety Coordinator (SHSC). The SHSC is responsible for implementing the Health and Safety Plan. The SHSC will perform Health and Safety monitoring and ensure compliance with all health and safety requirements at the facility.

- Field Sample Manager (FSM). The FSM has total custody of all samples from the time they are collected to the time they are shipped. The FSM is responsible for ensuring that all handling and documentation procedures are performed correctly.

All field operations will use the "buddy system." To ensure the use of the buddy system, a minimum of two field personnel will be present at all times during sampling. Depending on the schedule for the field sampling activity, WESTON's Project Manager will evaluate the need for additional personnel. When necessary, the FTL may also perform in the capacity of the SHSC. To the extent practicable, the FSM will not have any additional responsibilities other than caring for field samples. All personnel will be deemed field samplers in order to maximize utilization of all personnel at all times. The field samplers will collect the samples and perform equipment decontamination. In the absence of WESTON's Project Manager, the FTL will be responsible for providing QA of field activities.

3.4 LABORATORY OPERATIONS

WESTON-Gulf Coast Laboratories, Inc. will perform all analytical procedures for the Techalloy RFI/CMS. WESTON's Project Manager will arrange with the laboratory for all analyses. He will coordinate with the FTL in following up all arrangements with the laboratory. The following subsections discuss the organization and key responsibilities within WESTON-Gulf Coast Laboratories, Inc.. If WESTON must send some analyses to another laboratory, WESTON will prepare a QAPP addendum and submit it to the U.S. EPA Region V Project Manager for review and approval.

3.4.1 Laboratory Project Director and Project Manager

WESTON-Gulf Coast Laboratories, Inc. has established a Project Director/Project Manager group responsible for management of all analytical projects.

The laboratory's Project Director is responsible for the overall direction of the project and is the chief Quality Assurance Officer for the project. The Project Director is accountable for the following:

- Ensuring that all necessary resources of the laboratory are available for specific projects.
- Defining the level of excellence for the project performance and results.
- Ensuring the preparation of a tailored, Project Technical Profile or QAPP, as necessary.
- Ensuring peer review of the adequacy of QAPPs.
- Ensuring allocation of proper quality control budgets.
- Attaining concurrence with laboratory managers on objectives for performance and results.
- Achieving acceptable performance in implementing the project.
- Approving the quality of the project's data and reports.

The laboratory's Project Managers are responsible for preparing the Project Technical Profile. The profile summarizes the QA/QC requirements for the project. The Project Managers are also responsible for maintaining the laboratory schedule, ensuring that technical requirements are understood by the laboratory, and advising the Project Director and Laboratory Manager of all variances.

In general, the laboratory does not prepare project-specific QAPPs. The laboratory's Project Manager will provide technical guidance and the necessary laboratory-related information to the preparers. Also, the laboratory's Project Manager will provide peer review of the final document to ensure accuracy of the laboratory's information.

3.4.2 Laboratory Manager

The ultimate responsibility for the generation of reliable laboratory data rests with the Laboratory Manager. The Laboratory Manager has the authority to effect policies and procedures to ensure that only data of the necessary quality is produced. It is the Laboratory Manager's responsibility to see that all tasks performed in the laboratory are conducted according to the minimum requirements of the present QAPP to ensure that the quality of service provided complies with the project's requirements.

The Laboratory Manager supports the QA Section. The QA Section is not subordinate to or in charge of any person having direct responsibility for sampling and analysis.

The Laboratory Manager has several additional responsibilities. The Laboratory Manager coordinates laboratory analyses, supervises in house chain-of-custody procedures, schedules analyses of samples, oversees preparation of analytical reports, and reviews data.

3.4.3 Laboratory Quality Assurance Personnel

The Laboratory Quality Assurance Personnel have responsibility for conducting and evaluating results from system audits. In addition, the QA Section will control preparation of standard operating procedures and quality assurance documentation for the laboratory. the QA Section will review program plans, as requested, for consistency with organizational and contractual requirements. If the QA Section notes deficiencies, it will notify WESTON's Project Director. The QA personnel are responsible for establishing and implementing the laboratory's QA plan. The QA Section will review all of the data packages.

3.4.4 Section Managers and Unit Leaders

To assist the Laboratory Manager in achieving his goals, the Laboratory Section Managers and Unit Leaders are responsible for implementing the established policies and procedures.

The Managers and Leaders possess authority commensurate with their responsibilities for the day-to-day monitoring of laboratory activities.

Section Managers have the responsibility for ensuring that their personnel are adequately trained to perform analyses. Section Managers must also ensure that instrumentation under their control is calibrated and functioning properly, and that system audits are performed regularly.

3.4.5 Report Section Manager

The laboratory's Report Section Manager is responsible for coordinating receipt of all data from the various service groups within the laboratory. He reviews data for compliance to the laboratory's QC criteria and criteria in the project technical profile. He also ensures that all data are reported on time in the proper format.

3.4.6 Chemists and Technicians

Any effective QA/QC program depends on the entire organization, ranging from management to each individual on the laboratory staff. The initial review for acceptability of analytical results rests with the analysts conducting the various tests. Observations made during the performance of an analytical method may indicate that the analytical system is not in control. Analysts must use quality control indicators to ensure that the method is in control before reporting results.

3.4.7 Sample Log-In Personnel

Sample log-in personnel have a variety of responsibilities:

- Receiving incoming sample containers.
- Recording the condition (including temperature) of incoming sample containers on the chain of custody form.
- Signing appropriate shipping and receiving documents.
- Verifying chain of custody versus samples received.
- Notifying laboratory section managers and supervisors of sample receipt and receipt and required analyses.
- Assigning a unique identification number and customer account number, and entering each into the sample management system log.
- Controlling and monitoring access and storage of samples and extracts.

SECTION 4

QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall quality assurance objective is to develop and use procedures that are legally defensible. The purpose of the present section is to address the specific objectives for accuracy, precision, completeness, representativeness, and comparability. Sections 5 through 14 of the present QAPP describe specific procedures for sampling, chain-of-custody tracking, laboratory instrument calibration, laboratory analysis, data reporting, internal quality control, audits, preventive maintenance of field equipment, and corrective action. A data quality assessment will be performed and reported. This assessment will include the progress and to what extent the data quality objectives have been met.

4.1 LEVEL OF QUALITY CONTROL EFFORT

Field blank, trip blank, duplicate and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling program. Field and trip blank samples, consisting of ultra pure water, will be submitted to WESTON-Gulf Coast Laboratories, Inc. to assess the quality of the data resulting from the field sampling program. Field blank samples are analyzed to check for procedural contamination during field sampling activities at the site which my cause sample contamination. Trip blanks are used to assess any potential contamination due to migration of VOCs during shipment and storage of samples. Duplicate samples are analyzed to check for sampling and analytical reproducibility. Matrix spikes provide information about the effect of the sample matrix on the digestion and measurement methodology. All matrix spike samples are performed in duplicate and are hereinafter referred to as MS/MSD samples.

One MS/MSD sample will be collected for every 20 or fewer investigative samples for each matrix. MS/MSD samples are designated and collected for organic analyses only. The laboratory will perform laboratory duplicate and spike analyses for all inorganic analyses.

The laboratory will perform spike and spike-duplicate analyses for all inorganic analysis on a frequency of 1 per 20 or fewer investigative samples for each matrix

The field team will collect one field blank for every 10 or fewer investigative samples in the aqueous matrix (groundwater). The U.S. EPA Region V Central Regional Laboratory discourages the use of aqueous field blanks for soil and sediment samples. Therefore, no field blanks will be collected during soil sampling activities.

The field crew will collect field duplicate samples. One field duplicate will be collected for every 10 or fewer investigative samples for each matrix.

One trip blank will accompany each shipment container of volatile organic analysis (VOA) samples. The trip blank will consist of ultra pure water.

MS/MSD samples (for organic analyses) and duplicate/spike samples (for inorganics) are investigative samples for which extra volume is provided, as necessary, to aid analysis. In order to aid duplicate/spike analyses for soils and groundwater samples, double the volume will be collected for the double assigned investigative samples. In order to aid MS/MSD analyses for groundwater samples, double the volume will be collected for the assigned investigative samples. No extra volume is required for MS/MSD analyses of soil samples.

The specific level of field QC for samples collected as part of the Techalloy facility RFI/CMS is summarized in Table 2-13. Sampling procedures are specified in the FSP (Appendix A).

The QA objectives discussed in this and subsequent sections pertain to WESTON-Gulf Coast Laboratories, Inc. If any additional or alternative laboratories are assigned to perform analysis under this QAPP, WESTON will prepare an addendum to this QAPP. The addendum will outline any changes to the QA objectives. U.S. EPA will have the opportunity to review and approve the changes.

4.2 ACCURACY, PRECISION AND SENSITIVITY OF ANALYSIS

The fundamental QA objective with respect to accuracy, precision, and sensitivity of laboratory analytical data is to achieve the acceptance criteria of the analytical protocols. Analytical standard operating procedures (SOPs) for each laboratory analyses to be performed by the WESTON-Gulf Coast Laboratories, Inc., are provided in Appendix D. These SOPs include accuracy, precision, and sensitivity requirements of the analysis. SOPs for field equipment to measure pH, conductivity, and temperature are provided in Appendix B. The accuracy of field measurements of pH will be assessed through pre-measurement calibrations and post-measurement verifications using at least two buffer solutions. Each of the two measurements must be within ±0.05 standard unit of buffer solution values. Precision will be assessed with replicate measurements. (The electrode will be withdrawn, rinsed with deionized water, and re-immersed between each replicate.) The calibration and verification will be completed before the first replicate and after the last. The instrument used will be capable of providing measurements of ±0.01 standard unit.

Specific conductance will be measured by a conductivity meter with temperature compensation. The conductivity meter will be calibrated daily by insertion of the conductivity probe into a 1,000-micromhos (μg) standard solution before sample analysis. Precision will be assessed with replicate measurements. Sensitivity of the field measurements will be to the nearest micromhos (±5 percent).

Thermometers will be checked before each sampling event for accuracy against a NBS-calibrated thermometer (correlation to within one degree or the thermometer will be replaced) and record the measurements in the field logbook. The temperature measurement will be to the nearest degree (±0.5 degrees).

All field measurements will be to the nearest 0.1 unit (on the 1X scale) and will be recorded in the field logbook.

All monitoring wells will be surveyed for horizontal and vertical reference at the following locations: ground surface, marked reference point on inner stainless steel riser, and outer protective casing. The accuracy of the horizontal and vertical measurements will be ± 1.0 foot and ± 0.01 foot, respectively. Water levels will be referenced by elevation. The data collection will be referenced to a national geodetic datum.

Sensitivity

The sensitivity for the analyses will be the smallest change that the instrument can detect. Tables 8-1 and 8-2 (see Section 8) present the method detection limits and the acceptable reporting limits for the analytical parameters of concern.

Precision

In general, precision is the level of agreement among repeated independent measurements of the same characteristic, usually under a prescribed set of conditions (i.e., under the same analytical protocols). The most commonly used estimates of precision are the relative percent difference (RPD) and percent relative standard deviation (% RSD). RPD is appropriate when only two measurements are available. The % RSD is appropriate when three or more measurements are available.

WESTON will assess the precision of laboratory analysis for organic chemicals by comparing the analytical results between matrix spike and matrix spike duplicate samples. WESTON will calculate the RPD for each analyte pair. WESTON will record the RPD of the MS/MSD and will evaluate the RPD using statistically generated control limits.

For the remaining compounds, WESTON will assess precision based on the laboratory duplicates and spikes. For Techalloy facility data, a control limit of ±20 percent will be targeted, unless the SOPs specify otherwise. WESTON will calculate RPDs for all field duplicates. However, in accordance with the U.S. EPA's guidance (U.S. EPA, Laboratory

Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988, and U.S. EPA, Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, July 1988) the RPDs between field duplicate samples will not be assessed, since there are no review criteria for field duplicate analyses comparability.

Accuracy

Accuracy is the degree of agreement of the analytical measurement with the true or expected concentration. When applied to a set of observed values, accuracy is a combination of a random component and of a systematic error (or bias) component.

Analytical accuracy is expressed as the percent recovery of an analyte that has been used to fortify an investigative sample or a standard matrix (e.g., analyte-free water) at a known concentration prior to analysis. Tables 4-1 and 4-2 present the percent recovery sought for various project target compounds.

4.3 COMPLETENESS, REPRESENTATIVENESS, AND COMPARABILITY

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is expected that WESTON-Gulf Coast Laboratories, Inc. will provide data meeting QC acceptance criteria for 95 percent or more of all samples tested. The completeness objective for field measurements will also be 95 percent. Following completion of the analytical testing, WESTON will calculate the percent completeness as follows.